

SURVIVABILITY - SUSTAINABILITY - MOBILITY SCIENCE AND TECHNOLOGY SOLDIER SYSTEM INTEGRATION



TECHNICAL REPORT NATICK/TR-98/022

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FIELD ACCEPTANCE AND NUTRITIONAL INTAKE OF THE MEAL, READY-TO-EAT AND HEAT AND SERVE RATION

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May 1998

FINAL REPORT September 1995 - October 1997

Approved for Public Release; Distribution Unlimited

U.S. ARMY SOLDIER SYSTEMS COMMAND
NATICK RESEARCH, DEVELOPMENT AND ENGINEERING CENTER
NATICK, MASSACHUSETTS 01760-5020
SCIENCE AND TECHNOLOGY DIRECTORATE

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REPORT DOCUMENTATION PAGE

Form Approved OMB No. 0704-0188

Public reporting burden for this collection of information is estimated to average 1 hour per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Washington Headquarters Services, Directorate for Information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington, VA 22202-4302, and to the Office of Management and Budget, Paperwork Reduction Project (0704-0188), Washington, DC 20603.

2. REPORT DATE May 1998	3. REPORT TYPE AND Final September 1	DATES COVERED 995 - October 1997		
		5. FUNDING NUMBERS		
Field Acceptance and Nutritional Intake of the Meal, Ready-to-Eat and Heat and Serve Ration				
Matthew Kramer,				
(S) AND ADDRESS(ES)		8. PERFORMING ORGANIZATION REPORT NUMBER		
nd ingineering Center		NATICK-TR-98-022		
Y NAME(S) AND ADDRESS(E	ES)	10.SPONSORING / MONITORING AGENCY REPORT NUMBER		
		7.02		
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ATEMENT		12b. DISTRIBUTION CODE .		
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	14. SUBJECT TERMS FLAMELESS RATION HEAT			15. NUMBER OF PAGES 76
	NUTRITIONAL REQUIREME NUTRITIONAL INTAKE	ENTS CONSUMPTION FOO ACCEPTANCE RATI	D INTAKE MRE IONS SOLDIER	16. PRICE CODE
	17. SECURITY CLASSIFICATION OF REPORT	18. SECURITY CLASSIFICATION OF THIS PAGE	19. SECURITY CLASSIFICATION OF ABSTRACT	20. LIMITATION OF ABSTRACT
	UNCLASSIFIED	UNCLASSIFIED	UNCLASSIFIED	UNLIMITED

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PREFACE

This final report of the Meal, Ready-to-Eat (MRE) and the Heat & Serve Ration (H&S) was prepared by the U.S. Army Soldier Systems Command (SSCOM), Natick Research, Development and Engineering Center (NRDEC). Data collection took place during 2-11 September 1995 at Yakima Training Center, Yakima, WA with soldiers from the 1/37 Artillery Battalion from Ft. Lewis, WA. Ms. Kathryn Rock, a member of the Science and Technology Directorate was the project officer for the evaluation and is affiliated with the Behavioral Sciences Division. Ms. Judith Aylward is the project officer for the MRE and M. Susan Harrington is project officer of the H&S ration. Both are affiliated with the Sustainability Directorate. This report was prepared under project No. 11AAOKOO.

The authors gratefully acknowledge the assistance of Ruth Roth, Leslie Greene, Ann Curran, Michelle Richardson, Carol Norton, Jane Johnson, Julie Amati, and Lee-Ann Barkhouse of NRDEC, Ellen Jasset of GEO CENTERS, INC, Newton Ma. and P.J. Carr and Joanne Durante of Defense Personnel Support Center (DPSC), Philadelphia, PA. The authors also wish to express their appreciation to Mr John Redgate of NRDEC for his valuable editorial comments and support in the preparation of this report.

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FIELD ACCEPTANCE & NUTRITIONAL INTAKE OF THE MEAL, READY-TO-EAT AND HEAT AND SERVE RATION

INTRODUCTION

The MRE remains an integral member of the U.S. Army family of operational rations. However, to meet the soldiers' changing needs, the MRE requires continual improvement to enhance acceptability and improve nutritional intake to maintain peak performance on the battlefield. Through the Individual Soldier Enhanced Ration (ISER) program, 12 new menus will be introduced into the MRE, 4 menus in MRE XVI (1996 production), four menus in MRE XVII (1997 production) and four menus in the MRE XVIII (1998 production), making the total number of menus 24. The primary objective of the ISER program is to provide additional menus for the MRE to increase variety and reduce menu fatigue. Previous research has shown that menu fatigue can lead to a decrease in food acceptability and, in some instances, reduced intake. Reduced intake may impair soldier performance by not providing the appropriate nutritional requirements for an active adult in the battlefield (1,2,3,4,5); providing the soldier the best possible ration enhances the soldier's quality of life. To effectively sustain the soldier, high quality, highly acceptable, nutritious rations must be provided to maintain/enhance performance on the battlefield (6,7).

The Heat and Serve (H&S) (also known as the Tray Ration) is designed to sustain groups of military personnel in highly mobile field situations with high quality, nutritionally adequate meals. The H&S ration provides breakfast and lunch/dinner menus. The ration components, in the 10-day menu, are thermally processed, preprepared, shelf-stable, and packaged in hermetically sealed half-sized steam table metal containers. This ration has been an intergral part of the Army field feeding system (8,9). However, the H&S Unitized group ration (UGR) will soon succeed this ration and incorporate many H&S components. It should be noted that the Army plans to phase out the 18-man Tray Ration modules. However, the Marine Corps is expected to continue its use. Both of these rations require continuous improvements and additional variety to enhance acceptability, increase consumption and improve nutritional intake to maintain peak performance on the battlefield. Revisions of this ration are continuous through the Fielded Group Ration Improvement Program.

A field evaluation examining the acceptability of developmental and nondevelopmental food items for both the MRE and H&S Ration was conducted 2-11 September 1995 at the Yakima Training Center, Yakima, WA. This report details the findings of that evaluation.

METHODOLOGY

TEST SUBJECTS

Bravo and Charlie Batteries of the 1 Battalion 37th Artillery from Ft. Lewis, Washington participated in this evaluation. Bravo, the control group, was served the MRE XIII/XIV for the lunch meal with the standard H&S ration for both the breakfast and dinner meals. Charlie Battery (test group) consumed new MRE food items along with new H&S items.

TRAINING

During the evaluation, the battalion was engaged in a planned field exercise at the Yakima Training Center in Yakima, WA. Yakima Training Center is located approximately 200 miles southeast of Seattle, WA. The terrain is of desert type with dry sandy soil, scrub vegetation and no trees. The average temperature was approximately 40 degrees at night and rose to an average of 80 degrees during the day. It was mostly dry and dusty, although one day there was considerable rainfall.

Soldiers trained with self-propelled howitzers in various areas of the training center throughout this evaluation. Their activities consisted of midnight movements, direct fire, and fire support.

RATION AND RATION DISTRIBUTION

The ration cycle throughout the field exercise was H&S breakfast and dinner with an MRE lunch. The H&S breakfast was served daily between 0730 and 0900 and H&S dinner was served nightly between 1630 and 1900. Meals were heated at a field kitchen site then transported to a distribution point in 5-ton vehicles with heated food items and beverages in Cambro containers. The food was then transferred to HUMMVs for transport to the units. Hot meals were served on a small wooden table in the center of the units' position by kitchen support personnel. Once served, soldiers were required to return to their guns to eat their hot meal. The lunch MRE was distributed to the soldiers at the breakfast meal.

The flexibly packaged foods of the MRE are heat processed in retortable pouches. Each individual ration contains an entree/starch, crackers, a spread (cheese, peanut butter and/or jelly), a dessert, snack, beverage powders, an accessory packet, a plastic spoon and a Flameless Ration Heater (FRH). The MRE menus used during this evaluation can be found in Appendix A.

The H&S components are thermally-processed prepared, shelf-stable foods packaged in hermetically sealed, half-sized steam table metal containers. This ration provides food items for breakfast and lunch/dinner menus, along with instant beverages, non-dairy creamer, hot sauce, cups, utensils, and a 5 compartment tray for eating. The meal modules were supplemented with bread, milk, and fresh fruit (apples, oranges, and pears) at every meal, with an addition of cereal at the breakfast meal and salad at the dinner meal. Beverages such as coffee and juices were made in large batches and placed in Cambro containers for transport and serving. Chocolate and white shelf-stable milk in 8 oz cartons were also available during both breakfast and dinner meals. The H&S food items were heated using immersion heaters at the MKT area. Appendix A contains the breakfast and dinner H&S menus used for the field evaluation.

DATA COLLECTION

Data collected during this evaluation were primarily focused on MRE and H&S acceptance and consumption. Body weights, soldier demographics, portion-size ratings, and measurements of test participants opinions were also collected. Table 1 illustrates the data collection schedule for the evaluation.

Table 1
Data Collection Schedule

	Base Line	Day	Day	Day	Day	Day	Day	Day 7	Day	Day	Day
Background	Line		<u> </u>	2	ュ	7	Ω	<u></u>	<u>o</u>	2	10
Questionnaire	X										
Body Weight	X				X			\mathbf{X}			X
Food Intake	X	X	X	X	X	X	X	X	X	X	
Food Acceptance	X	X	X	X	X	X	X	X	X	X	
Final Questionnai	re										X
Focus Group											X

BASELINE TESTING

Prior to the field evaluation, test participants were briefed on the purpose of the field evaluation and testing procedures. At the conclusion of the briefing, soldiers completed a short questionnaire providing demographics and baseline ration opinions. See Appendix B for the background questionnaire used in this evaluation.

BODY WEIGHTS

Body weights were collected in the field using SECA digital scales which were placed on wooden boards for stability. Soldiers were asked to remove all heavy garments such as jackets, weapons, and web belts, along with all articles from their pockets. Data collectors recorded all clothing on the soldier when weighed (See Appendix B). Weights were collected prior to the breakfast meal on Days 1, 4, 7, and 10. Body weights were obtained to monitor weight change of soldiers subsisting on military rations. Scales were calibrated prior to the field evaluation and monitored for accuracy throughout the evaluation.

FOOD ACCEPTANCE

All food acceptance was measured using a 9-point hedonic scale (See Table 2) on the MRE Intake Forms (Appendix B). Soldiers were instructed to rate only the ration food items consumed. MRE Intake Forms were distributed at the breakfast meal, completed over a 24-hour period, and returned to the data collector at the following breakfast meal. H&S acceptability forms (Appendix B) were distributed before the breakfast and dinner meals then completed and collected after the soldier ate his meal. Data collectors reviewed each form, MRE Intake and H&S Intake, with the soldier to ensure completeness and

accuracy. To yield a mean response with equal weight given to each subject, ratings for food items eaten more than once over the course of the study were averaged for each soldier and this average was used when the overall acceptability rating was calculated.

Table 2 Food Acceptability Scale

DISLIKE EXTREMELY	DISLIKE VERY MUCH	DISLIKE MODERATELY	DISLIKE SLIGHTLY	NEITHER LIKE NOR DISLIKE	LIKE SLIGHTLY	LIKE MODERATELY	LIKE VERY MUCH	LIKE EXTREMELY
1	2	3	4	5	6	7	8	9

FOOD INTAKE

Food intake was measured to determine the soldiers' caloric and nutrient intake for both rations (H&S and MRE) served during this evaluation. Intake was measured by visually analyzing food waste of both the MRE and H&S rations.

To measure MRE intake, the MRE trash was compared to the self-reported consumption information from the MRE Intake Form. Each morning soldiers returned all MRE trash, food waste and packaging to the data collector in a plastic zip lock bag which was provided along with the MRE Intake Form. All discrepancies between the two sources of food intake information were noted and later resolved with the individual at the next meal.

The H&S intake was measured using visual estimation techniques. During each meal, a "standard tray" was measured out. This consisted of a tray containing a recommended portion of each food item served at a given meal. Most food items on the standard tray of food were measured using an 8 oz measuring cup. This standard tray was placed in view of all data collectors. Before and after consumption, a soldier's food was visually compared to the food on the standard tray and the amount of each food item on the soldier's tray was recorded on the visual estimation form (Appendix B).

During this evaluation, soldiers were requested to consume only the rations provided by NRDEC. This would allow caloric calculations based solely on military ration consumption and to calculate an approximate level of soldier sustainability while consuming only military rations. Pogey bait (non-ration food items) consumption was to be reported on the MRE Intake Records, but due to our request, the majority of soldiers were reluctant to report any the pogey bait that was consumed. Though the ration continues to provide acceptable food items and food items more commonly eaten by soldiers, non-ration food item (pogey bait) consumption continues during field exercises.

FINAL QUESTIONNAIRE

On the last day of data collection, Day 10, the test participants completed a final questionnaire. This questionnaire obtained soldiers opinions on general aspects of the rations and eating habits during the exercise. The final questionnaire can be found in Appendix B.

FOCUS GROUP

On the last day of data collection a focus group was conducted with both Bravo and Charlie Batteries. This offered additional information and recommendations for the items evaluated.

RESULTS

DEMOGRAPHICS

Table 3 summarizes the demographic information of the Control (n=38) and Test (n=39) groups. On average these soldiers have been in the Army over 5.5 years (Control = 6.2 yrs, Test = 5.9 yrs) and both groups had a mean age of 26.3. All test participants were male.

Table 3 Demographics

Rank (n): Enlisted: Officers	E1 E2 E3 E4 E5 E6 E7 E8 O1 O2	Control 1 2 4 19 5 4 1 - 1 1	Test 5 2 15 9 4 1 1
Ethnic Backgrow White Black Hispanic Asian/Pac	ific Island	Control 47 37 11 - 3	Test 35 46 10 3 3
Some Hig	Grade School h School ool Grad/equiv. lege	Control 3 3 31 50 13	Test 3 38 51 8

RATION ACCEPTABILITY

Acceptability ratings reported in Tables 4, 5 and 6 are the mean ratings from the MRE Intake Forms and H&S Acceptability Forms. The number of responses (n) is the number of subjects who rated a particular food item. If a subject rated an item more than once, his ratings were averaged before the mean acceptability rating was calculated. This approach yields mean responses with equal weight given to each participant. All food mean acceptability ratings are reported in the following tables. Items with N's below 10 are identified using italics. These ratings should not be considered as reliable as ratings by a greater number of respondents. Tables 4A & 4B show the mean acceptability ratings for the breakfast H&S foods for both the control and test groups, Table 5A & 5B shows the lunch MRE ratings, and Tables 6A & 6B are the acceptability ratings from the dinner H&S meals. Overall, the majority of the food items, with an N above 10, received ratings above the mid point of the scale (5, Neither Like nor Dislike). Only two food items received mean ratings lower than the scale midpoint (with an n above 10): Western Scrambled Eggs(Natick) and Scrambled Eggs w/Bacon(Natick). These two mean ratings were received from the control group.

Table 4A
Control Group
H&S Breakfast Acceptability Ratings (n=38)

Food Groups Entrees	Food Item Waffles Creamed Ground Beef Corned Beef Hash Western Scrambled Eggs (Natick) Scrambled Eggs w/Bacon (Natick)		<u>N</u> 38 32 26 35 29
Meat Side	Pork Sausages	6.9	37
Dishes	Ham Slices	6.0	36
Starches	White Bread	7.4	34
	Wheat Bread	6.6	32
	Potatoes w/Bacon	6.1	35
Spreads	Peanut Butter	7.7	6
	Jelly	7.3	7
Snacks	Lemon Pound Cake	8.0	35
	Vanilla Pound Cake	7.8	27
	Pineapple Pound Cake	7.6	17
Fruits	Peach Slices Fruit Cocktail Apple Dessert Canned Pears	7.9 7.6 7.0 7.0	35 32 33 23
Fresh Fruit	Apple	7.9	17
	Orange	7.5	17
	Pear	7.5	6
Oatmeal	Raisin, Spice & Dates Maple & Brown Sugar	8.4 8.4	12 9
Beverages	Cocoa Orange Juice Chocolate Milk Coffee White Milk Grape Juice	7.4 7.3 7.3 7.1 6.6 5.9	10 35 22 11 22 31
Condiments	Hot Sauce	7.7	20
	Maple Syrup	6.6	38
	Ranchero Sauce	5.4	33

^{*} Natick - NRDEC developed eggs

Table 4B
Test Group
H&S Breakfast Acceptability Ratings (n=39)

Food Groups Entrees	Food Item Blueberry Waffles Creamed Ground Beef Ground Sausage in Gravy Roast Beef Hash Western Scrambled Eggs (OFD)* Scrambled Eggs w/Bacon (OFD)	Mean 7.1 6.0 5.8 5.7 5.7 5.0	N 34 27 28 25 30 25
Meat Side Dishes	Pork Sausages Ham Slices	6.3 5.2	32 32
Starches	White Bread Corn Bread Wheat Bread Potatoes w/Bacon Biscuits	6.8 6.6 6.5 6.0 5.2	27 23 27 34 27
Spreads	Jelly Peanut Butter	7.8 7.2	<i>3</i> 2
Snacks	Pineapple Pound Cake Orange Pound Cake Vanilla Pound Cake Lemon Pound Cake Tea Loaf	7.8 7.7 7.6 7.6 6.8	12 29 32 30 29
Fruits	Fuit Cocktail Peach Slices Pineapple Canned Pears	7.9 7.6 7.4 7.4	30 34 28 21
Fresh Fruits	Apple Orange Pear	7.7 7.4 6.4	25 13 22
Cream Of Wheat	Raisin, Dates & Nuts Maple & Brown Sugar Regular	8.2 6.9 5.0	6 9 4
Beverages	Chocolate Milk Cocoa Orange Juice Coffee White Milk Grape Juice	7.0 7.0 6.8 6.7 6.2 6.1	24 5 28 10 25 28
Condiments	Blueberry Topping Hot Sauce Ranchero Sauce Salsa, Wet Pack Maple Syrup	7.4 7.0 6.9 6.8 6.7	22 21 25 18 32

^{*} OFD - Oregon Freeze Dry developed eggs 7

Table 5A Control Group MRE XIII Lunch Acceptability Ratings (n=38)

Food Groups Entrees	Food Item Pork Chow Mein Ham Slices Spaghetti w/Meat Sauce Chicken Stew Smoky Franks Chicken w/Rice Beef Stew Esc Potatoes w/Ham Corned Beef Hash Tuna w/Noodles Pork w/Rice Omelet w/Ham	Mean 7.9 7.8 7.3 7.3 7.2 7.1 6.0 5.9 5.6 5.2 5.1 4.6	N 11 13 12 12 15 13 10 11 9 9
Starches	Chow Mein Noodles	7.8	10
	MRE Cracker	6.2	33
	Potato Au Gratin	5.3	9
Spreads	Peanut Butter	7.3	24
	Cheese Spread	6.9	24
	Jelly	6.6	20
Snacks	Lemon Pound Cake Orange Pound Cake Pineapple Pound Cake Vanilla Pound Cake Potato Sticks Chocolate Covered Cookie Choco Mint Pond Cake Chocolate Covered Brownie Oatmeal Cookie Bar Peanuts	8.4 8.0 8.0 7.9 7.6 7.2 7.0 6.1 5.6 4.0	19 9 3 10 16 20 2 13 13 1
Fruits	Pineapples, WP* Peaches, WP Mixed Fruit Applesauce Peaches, FD* Pears, FD	9.0 9.0 8.3 7.6 7.1 5.3	<i>I I 9</i> 19 8 5
Beverages	Lemon-Lime Bev Base	8.I	6
	Lemon-Lime, SF**	7.8	4
	Lemonade, SF	7.7	11
	Orange Bev Base	7.7	7
	Cherry Bev Base	7.6	10
	Tea, SF	7.0	9
	Fruit Punch, SF	6.8	12
	Grape Bev Base	6.6	12
	Coffee	5.8	6
	Cocoa	5.7	11

^{*} WP - Wet packed fruit, FD - Freeze Dried Fruit ** SF - sugar free

Table 5A (cont)
Control Group
MRE XIII Lunch Acceptability Ratings (n=38)

Food Groups Candy	Food Item M&M's Tootsie Roll Chocolate Bar Vanilla Caramels Charms	Mean 8.3 8.3 7.6 7.5 6.3	N 28 8 15 15
Acc Pack	Gum	7.6	33
	Hot Sauce	7.4	25
	Sugar	6.3	20
	Creamer	5.6	12
	Salt	5.3	12

Table 5B
Test Group
Test MRE Lunch Acceptability Ratings (n=39)

iest	MRE Lunch Acceptability Rai	ungs (n=39)	
Food Groups Entrees	Food Item Teriyaki Beef Spicy Oriental Chicken Salsa Chicken Meatloaf w/Gravy Beef Enchiladas Sausage Patty Black Beans & Rice Burrito Pasta Primavera Alfredo	Mean 7.2 7.1 6.7 6.7 6.6 6.2 6.1 5.9	N 26 24 25 24 23 23 28 23
Starches	Chow Mein Noodles Buttered Noodles MRE Crackers Vegetables MRE Cracker Mexican Rice White Rice	6.9 6.8 6.5 6.5 6.1 5.5	26 24 32 32 19 28
Spreads	Jalepeno Cheese Spread Strawberry Jam Cheddar Cheese Spread Peanut Butter	7.7 7.4 7.2 6.7	28 30 22 31
Snacks	Choco Chip Bar Apple Fruit Bar Strawberry Fruit Bar Lemon Pound Cake Blueberry Fruit Filled Bar Roasted Peanuts Snack Mix Honey Nut Bar Beef Jerky Apple Cinnamon Toaster Pastry Corn Chips Fudge Brownie Shortbread Cookies Chewy Chocolate Bar Peanut Butter Bar	8.4 8.1 8.0 7.9 7.7 7.7 7.7 7.6 7.6 7.4 7.4 7.3 6.3 6.0	8 16 16 27 17 27 20 17 25 24 24 23 22 23 7
Fruits	Fruit Mix Cinnamon Apples Applesauce	7.8 7.6 7.2	22 25 21
Beverages	Lemon Tea Grape Bev Lemon-Lime Bev English Tea Time Coffee Earl Gray Tea Cocoa Apple Cider	7.7 7.6 6.7 6.7 6.2 6.0 5.8	24 7 17 6 5 16 3 22
Acc Packs	Gum BBQ Sauce Hot Sauce Sugar Salt Creamer	7.3 7.0 6.9 6.0 5.1 5.0	33 25 26 22 17 16

Table 6A
Control Group
H&S Dinner Acceptability Ratings (n=38)

	-		
Food Group	Food Item	<u>Mean</u>	<u>N</u>
Entrees	Meatballs and Gravy Spaghetti and Meatballs BBQ Pork Ribs Lasagna Beef Strips w/Peppers Beef Patties Chicken Breast w/Gravy Turkey Slices Chicken Chow Mein	7.1 7.1 7.0 6.7 6.6 6.4 6.4 6.4 6.3	37 33 35 35 35 37 33 31 36
Vegetables	Corn Mixed Vegetables Green Beans Sweet Potatoes	6.9 5.9 5.7 5.7	35 29 34 27
Starches	Wheat Bread White Bread White Rice Pork and Beans Red Beans & Rice Potatoes w/Butter Sauce Oriental Rice Hamburger Buns	7.1 7.1 6.9 6.6 6.0 6.0 5.9 5.2	27 36 36 33 34 31 35 30
Spread	Jelly Peanut Butter Cheese Spread	7.3 7.3 6.7	25 25 17
Snacks	Orange Pound Cake Blueberry Dessert Marble Cake w/Topping Yellow Cake w/Topping Chocolate Cake w/Topping	7.7 6.9 6.7 6.3 6.2	24 22 21 33 35
Fruits	Peach Slices Fruit Cocktail	8.1 7.8	35 28
Fresh Fruit	Apple Pear	7.1 7.1	13 16
Beverages	Cherry Beverage Chocolate Milk Lemon-Lime Beverage Orange Beverage White Milk Cocoa Coffee	7.9 7.4 7.4 7.4 7.2 7.0 7.0	19 25 31 22 18 <i>I</i>
Condiments	Hot Sauce	8.0	13

Table 6B
Test Group
H&S Dinner Acceptability Ratings (n=39)

	s similar recopitationity	Matings (II-57)	
Food Group Entrees	Food Item Chili w/Beans Chicken Teriyaki BBQ Pork Ribs Braised Beef w/Noodles Turkey Slices w/Gravy Cajun Meatloaf Fankfurters Tamale Pie Chicken Breast w/Gravy	Mean 6.8 6.8 6.6 6.5 6.3 5.9 5.7 5.6	N 33 26 32 35 31 33 32 25 35
Vegetables	Corn Green Beans Mixed Vegetables Sweet Potatoes Carrots Three Bean Salad	6.5 6.2 6.1 5.9 5.9 5.1	36 36 27 24 15 12
Starches	White Bread Oriental Rice Corn Bread Wheat Bread White Rice Spanish Rice Hamburger Buns Red Beans & Rice Pork and Beans Potatoes w/Butter Sauce	7.0 6.9 6.6 6.6 6.5 6.3 6.3 6.2 6.2 5.6	36 26 32 19 36 37 23 32 31 29
Spread	Peanut Butter Jelly	7.5 7.4	10 12
Snack	Butterscotch Pudding Tea Loaf Chocolate Pudding Orange Pound Cake Choco Mint Pound Cake Cherry Pie Filling Tapioca Pudding	7.4 7.4 7.4 7.4 6.8 6.7 6.5	20 27 25 16 24 16 17
Fruit	Canned Pears Tropical Fruit Salad	7.4 7.3	23 27
Fresh Fruit	Apple Orange Pear	7.6 7.3 7.3	25 15 12
Beverages	Grape Beverage Chocolate Milk Coffee Lemon-Lime Beverage Cherry Beverage White Milk	7.6 7.3 7.3 6.9 6.9 6.5	15 17 3 30 26 12
Condiments	Hot Sauce	. 6.9	16

RATION ACCEPTABILITY BY FOOD GROUP

For analysis of food groups, food items served during the evaluation were combined into foodgroups as seen in Tables 4 through 6. Each food group mean was calculated using the daily food acceptance ratings from the MRE Intake Records and the H&S ration acceptability forms. The ratings were collapsed by food group. Table 7 shows the acceptability of these food groups by meal. It should be noted that all calculated mean food group acceptability ratings were above 5.0.

Control Group: The breakfast foodgroups received mean ratings ranging from 5.5 to 8.4 with a median of 7.5. The highest rated breakfast H&S item was hot cereal, while the entrees received the lowest rating for that meal. The mean dinner food groups ranged from 6.2 to 8.0 and had a medan of 7.4. Vegetables were the lowest rated and fruit the highest. For the MRE, the ratings ranged from 6.4 to 7.2 with a median of 6.9. The fruits and condiments were rated the highest (7.2), while the starches were the lowest rated foodgroup of this ration with a mean rating of 6.4.

Test Group: The food groups for the breakfast meal had mean acceptability ratings ranging from 5.8 to 7.9, with a median score of 7.4. Cold cereal received the highest rating (7.5) while the meat side dishes received the lowest rating (5.8). The dinner meal acceptability ratings ranged from 6.2 to 7.6 with a median of 7.05. Similar to the control group, vegetables received the lowest acceptability rating. The highest rated food group was the spreads. The MRE evaluated by the test group was also well received, with acceptability ratings from 6.4 to 7.4 and a median of 6.9. The entree and starches were rated the lowest and the snacks available to this group were the highest rated food group.

Table 7
Food Group Acceptability Ratings

H&S Breakf	Entrees Meat Side Dishes Starch Spread Snacks Fruit Fresh Fruit Hot Cereal (oatmeal) Beverages	Control 5.5 6.4 6.8 7.6 7.7 7.6 7.8 8.4 7.1	Test 6.1 5.8 6.1 7.3 7.5 7.6 7.4 7.4 6.9
	Condiments Cold Cereal	6.9 7.5	7.0 7.9
MRE Lunch	Entrees Starch Spread Snacks Beverages Fruit Condiments	Control 6.5 6.4 6.9 7.1 6.9 7.2 7.2	Test 6.4 6.4 7.1 7.4 6.7 7.3 6.9

Table 7 (cont.)
Food Group Acceptability Ratings

H&S Dinner	<u>Control</u>	<u>Test</u>
Entrees	6.9	6.2
Vegetables	6.2	6.2
Starch	6.6	6.6
Spread	7.4	7.6
Snacks	6.6	7.1
Fruit	8.0	7.3
Fresh Fruit	7.4	7.5
Beverages	7.4	7.0
Condiments	7.8	7.2
Salad	6.7	6.5

CALORIE AND NUTRIENT INTAKE

Calorie and nutrient intake were computed on the basis of the MRE Intake Forms, the Visual Estimation Forms and the known caloric and nutrient composition of the ration food items. Table 8 shows the average daily intakes of calories, protein, fat, carbohydrates, sodium, and the percentages of calories derived from protein, fat and carbohydrates. Also in the table below is the Nutritional Standards for Operational Rations (NSOR) which is the military recommended dietary allowances (MRDA) for military personnel. The MRDA is the daily recommended nutrient intake levels, based on estimated nutritional requirements, of 17-to 50-year-old moderately active military personnel. This information can be found in Army Reg. 40-25, The Naval Command Medical Instruction 10110.1, Airforce Reg. 160-95 Nutritional Allowance, Standards, and Education dated 15 May 1985. Detailed tables showing the daily intakes along with percentages from each meal can be seen in Appendix C. In Table 8 it is shown that the test group consumed slightly more kilocalories (KCALS) than the control group, although both groups fell below the NSOR minimum requirement of 3600. Since pogey bait was rarely reported, these values for the test and control group represent minimal values for the KCALS and nutrients reported in Table 8. The majority of past field evaluations report the daily caloric intake to fall below the NSOR, the average of the field evaluations from 1986 to 1993 is 2678 calories. Sodium intake also fell below the NSOR in both groups and the fat intake approximated the recommended maximum.

Table 8
Average Daily Intake by Group

	Control	<u>Test</u>	NSOR
Kcals	2468	265 8	3600
Fat	95	108	160
Protein	101	93	100
Carbohydrates	307	332	440
Sodium	4113	4391	7000
% Fat	34.3%	36.5%	35%
% Protein	16.2%	13.9%	
% Carbohydrates	49.5%	49.6%	50%

CALORIC INTAKE BY RATION

The table below shows the KCAL intake broken down by meal and food group. The percent daily KCALs (% Daily) consumed are the KCALs divided by the total mean calories consumed (see Table 9) yielding the percent of calories consumed per foodgroup broken down by meal, e.g 11% of a total calories consumed came from the H&S breakfast meal entree. When the calories consumed for each food group are broken down by meal (% by Meal), the data indicates most calories per meal are from the entree for all three meals, 27% at breakfast, 24% at lunch and 23% at dinner. The majority of calories came from the breakfast H&S meal while the soldiers consumed the least amount of calories from the MRE lunch. Overall, the highest percent of calories consumed were from the entrees, while starches, snacks and drinks provided the next most KCALs. Table 9 also shows a greater MRE consumption in the test group, accounting for most of the differences in average daily caloric intake in the two groups.

Table 9
KCAL Intake and Percent of Caloric Intake

H&S Breakfast Entrees Meat Side Dishes Hot Cereal Starch Snacks Spread Drinks Fruit Condiments Fresh Fruit Cold Cereal	KCAL 1007 270 121 24 142 164 6 182 41 31 15	Contro 2 Daily 41 11 5 1 6 7 .2 7 2 1 .6 .4	27 12 2 14 16 .6 18 4 3 1	KCAL 966 242 87 20 135 221 3 131 38 34 36 18	Test Mark Daily 36 9 3 .7 5 8 .1 5 2 1 1 .7	% By Meal 25 9 2 14 23 .3 14 4 4 4 2
MRE Lunch Entrees Starch Snacks Spread Drinks Fruit Candy Condiments	573 137 93 128 78 34 19 78 7	23 5 4 5 3 1 .8 3	24 16 22 14 6 3 14	813 192 174 247 128 36 27 N/A 9	31 7 7 9 5 1 1	24 21 30 16 4 3
H&S Dinner Entrees Vegetables Fruit Starch Snacks Spread Drinks Condiments Fresh Fruit Salad	886 208 51 42 205 123 59 133 20 16 28	36 8 2 2 8 5 2 5 .8 .7	23 6 5 23 14 7 15 2 2	875 238 40 11 252 102 30 107 9 21 62	33 9 2 .4 10 4 1 4 .3 .8 2	27 5 1 29 12 3 12 1 2 7

RATION VARIETY

Prior to the evaluation, the test participants rated the variety of the rations they typically eat during field exercises. This same question was again addressed on the final questionnaire. The 7-point scale displayed below was used to rate variety. Tables 11 and 12 report the mean variety rating from the background questionnaire (Pretest) and the final questionnaire (Posttest). These soldiers received MRE XIII/XVI (control group) and a ration of all test items (test group). Typically, outside of the test, they consumed MRE XII or earlier version.

Overall, the majority of variety ratings of the food groups increased at least slightly from pretest ratings to posttest ratings. The ratings by the control group on the MRE showed little to no change, and two of the food groups showed a slight negative change while test group ratings all showed a positive change. The most noticeable change was the H&S cake foodgroup ratings by the control group. The cakes went from the lowest rated food group pretest to the highest rated food group posttest. The overall ration variety ratings all increased by at least 1/2 of a scale point, except the MRE ratings by the control group which increased by only one-tenth.

Table 10 MRE Variety Scale

Extremely	Moderatley	Slightly	Just	Slightly	Moderately	Extremely
Too Little	Too Little	Too Little	Right	Too Much	Too Much	Too Much
Variety	Variety	Variety	C	Variety	Variety	Variety
1	2	3	4	5	6	7

Table 11 MRE Variety Ratings

	Control Group		Test	Group
	Pre-Test	Post -Test	Pre-Test	Post -Test
Entrees	3.2	3.3	2.9	3.7
Crackers	3.4	3.3	3.0	3.5
Spreads	3.0	3.3	3.0	3.5
Desserts	2.8	2.8	2.9	3.5
Cakes	2.8	3.2	2.9	3.5
Fruits	3.0	3.1	2.7	3.6
Snacks	3.0	3.1	2.8	3.4
Beverages	2.9	2.9	2.8	3.2
Candy	3.3	3.2	2.8	3.7
Overall	3.1	3.2	3.1	3.7

Table 12 H & S Variety Ratings

	Control Group		Test	Group
	Pre-Test	Post -Test	Pre-Test	Post -Test
Breakfast Entree	2.6	3.0	2.6	3.3
Dinner Entrees	3.0	3.5	2.8	3.6
Vegetables	3.3	3.4	2.8	3.7
Starch	3.2	3.5	3.3	3.7
Cakes	2.2	3.6	2.9	3.7
Desserts	2.5	3.0	2.9	3.5
Fruits	2.8	3.4	2.8	3.4
Beverages	2.6	2.9	2.7	3.2
Candy	2.5	2.9	2.6	2.8
Overall	2.6	3.4	2.7	3.6

HEATING

In both control and test groups, slightly more than half (58%) of the MRE entrees consumed were heated. Table 13 and 14 reports the percent of soldiers that heated each MRE entree. Typically, most entrees were heated before eating. Entrees such as Pork with Rice, Corned Beef Hash, Ham Slices, and Potatoes w/Ham were more often consumed not heated than heated by the control group. Overall, a higher percentage of entrees was heated by the test group (69%) than the control group (58%).

Table 13
Control Group
Percent of soldiers heating entrees

	Percent Yes	Percent No	N
Omelet w/Ham	100	-	<u>N</u> 5
Chicken Chow Mein	89	11	18
Chicken Stew	85	15	13
Pork Chow Mein	80	20	15
Spaghetti w/Meat Sauce	70	30	20
Smoky Franks	63	37	24
Beef Stew	5 0	50	12
Tuna w/Noodles	5 0	50	10
Potatoes w/Ham	46	54	11
Ham Slices	39	61	18
Pork w/Rice	29	71	17
Corned Beef Hash	19	81	16

Table 14
Test Group
Percent of soldiers heating entrees

	Percent Yes	Percent No	N
Teriyaki Beef	80		$\overline{41}$
Beef Enchiladas	77	23	30
Pasta Primavera Alfredo	77	23	26
Spicy Oriental Chicken	73	27	29
Sausage Patty	70	30	32
B. Bean & Rice Buritto	69	31	33
Salsa Chicken	69	31	32
Meatloaf	68	32	37

PORTION SIZE

Using the 7-point scale shown in Table 15, portion sizes of the ration entree and the size of the complete meals of both the MRE and H&S rations were rated. The meal size was rated at each meal while the entree portion size was rated on the final questionnaire. See Appendix D for a complete listing of the portion size ratings. All MRE and H&S entrees rated received ratings around the scale midpoint of "Just Right" ranging from 3.4 to 4.2. Of all the entrees rated, the H&S blueberry waffles, a well liked entree, received the lowest rating for portion size.

Ratings for the meal size also fell around the midpoint of the scale. The MRE meal ratings ranged from 3.1 to 4.0 and the range for the H&S meals were 3.4 to 3.9 for the breakfast meal and 3.6 to 3.9 for the dinner meal. The amount of food in the MRE sausage patty meal received the lowest rating, 3.1.

Table 15 Portion Size Scale

Much	Moderately	Somewhat	Just	Somewhat	Moderately	Much
Too Small	Too Small	Too Small	Right	Too Large	Too Large	Too Large
1	2	3	4	5	6	7

HOT SAUCE PACKAGE

The hot sauce in the MREs distributed to the test group were packaged in a prototype container. This container was made of a flexible plastic material, Polyvinylidene Chloride. The data indicates that the glass and prototype package did not perform differently in the field in most areas. Areas where there were differences in ratings were spilling/splashing of the hot sauce while opening, taste of the hot sauce and appropriateness of the amount of trash generated.

Spilling/splashing while opening occurred more with the test group using the pouch container than with the control group using the glass container. Forty-eight percent of the soldiers from the test group reported spilling and splashing from the pouch while only 4% from the control group reported spilling/splashing from the glass container. In general, spilling/splashing was experienced only once by a given soldier from both container types. Of the soldiers that did experience spilling/splashing, the majority (test 71%, control 100%) did not find this to be a problem.

The taste of the hot sauce was addressed by the soldiers using the pouch container during the focus group. Several soldiers reported that the hot sauce in the pouch tasted milder than the hot sauce they remembered in the glass container. They indicated that the hot sauce appears to be absorbed into the plastic packaging, discoloring the package.

Once the test group evaluated the plastic hot sauce container for 10 days they were asked which container they preferred, glass or pouch. Forty-eight percent preferred the glass container while 52% preferred the plastic pouch. The soldiers that preferred the glass container rated the taste of the hot sauce (7 point scale with anchors 1 = "Very Poor", 7 = "Very Good") in the pouch as 4.8 while the soldiers that preferred the pouch rated the taste (in the pouch) as 5.7. Though these means are not significantly different it suggest that the soldiers did consider taste when making a choice among the containers.

Another notable difference was the response to whether the soldiers wanted a reclosable container. The majority (59%) of the control group responded YES to that question along with the majority (59%) of the test group. The responses of the test group also show that, of the soldiers that preferred the plastic pouch, 40% preferred a reclosable container. Among the soldiers that preferred glass, 79% preferred a reclosable container.

The test group evaluated trash generated for both the glass and plastic pouch container. A 7-point scale with anchors "Extremely Inappropriate" to "Extremely Appropriate" was used to evaluate this attribute. These soldiers rated trash generated by the glass container (4.1) significantly less appropriate than the trash generated by the pouch (4.9). Though they are significantly different, they both fall above "Neither Inappropriate Nor Appropriate", the midpoint of the scale. Also, soldiers from the test group that preferred the plastic pouch rated the amount of trash generated by the glass container as more inappropriate than the amount of trash generated by the pouch (glass 3.7, pouch 4.9) while the soldiers who preferred the glass container found the amount of trash generated by the two containers as similar, glass 4.6, pouch 4.9.

BODY WEIGHT

The OTSG guidance suggests that the troops should not lose more than 3% of their initial body weight during field operations. Of all the soldiers that participated in this field evaluation, no soldier exceeded this 3% limit of weight loss. An interval, bounded by a weight gain or loss of at least 2%, contains 89% of the soldiers from the control group, while 71% from the test group showed less than 2% weight change. A higher number of soldiers from the test group (7 out of 34) gained 2% or more of their original weight, while only 2 out of 35 soldiers in the control group gained 2% or more of their original weight.

CONCLUSIONS

- Most H&S breakfast and dinner items received acceptability ratings above 5.0, the mid-point of the 9 point acceptability scale. The acceptability ratings of the eggs served to the control group indicate the need for continued development to increase soldiers' acceptability of this product. The number of soldiers that received the Cream of Wheat oatmeals are low because of the availability of the items, they were not distributed to the remote feeding sites by the MKT. These items, once received at the remote sites, were very well received by the soldiers. If the availability of this item increased, the number of soldiers consuming the oatmeal would also increase.
- All MRE items (rated by more than 10 soldiers) were well received. The data indicates the variety in the ration is acceptable.
- Variety ratings showed the most positive change for the test MRE reflecting the higher number of new food items offered. Variety ratings were similar for the test and control H&S ration.
- Consistent with past field trials, average daily intake in the breakfast and dinner H&S meals was similar for the two groups.
- As tested here, consumption of the test MRE was significantly higher in the test group compared to the control group.
- Positive findings of nutrient intake include fat and sodium intake levels falling somewhat below the recommend NSOR, while less desirable findings include the overall caloric intake falling below the NSOR 1000 to 1100 calories.
- Portion sizes, as seen before, were generally rated close to, but slightly less than, "Just Right".
- The two hot sauce containers, glass and pouch, performed well and similarly in the field. Ease of use and durability were viewed as appropriate for field use. Soldiers generally indicated that the trash generated by the plastic pouch was more appropriate than the bottle. Given these similar performances, these data provide a basis for use of the pouch and no strong basis for keeping the glass bottle. The apparent absorbtion of hot sauce by the pouch may warrant further investigation to explore the impact on the life of both product and package. Analysis of hot sauce before and after storage in glass and pouch may indicate any flavor/chemical composition changes.
- Overall, soldiers did not show major weight gain or loss during this evaluation.

This document reports research undertaken at the U.S. Army Soldier Systems Command, Natick Research, Development and Engineering Center and has been assigned No. NATICK/TR97022 in the series of reports approved for publication.

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APPENDICES

APPENDIX A MENUS

Control Menu Meal, Ready to Eat XIII

Menu 1
Pork W/Rice
Applesauce
MRE Cracker
Jelly
Sugar Free Beverage Base
Beverage Base
Cocoa Beverage
Acc Pkt B

Menu 3
Chicken Stew
TS Fruit*
MRE Cracker
Peanut Butter
Candy
Cocoa Beverage Powder
Beverage Base
Acc Pkt A

Menu 5
Spaghetti W/Meat Sauce
MRE Cracker
Cheese Spread
Pound Cake
Candy
Sugar Free Beverage Base
Acc Pkt A

Menu 7
Beef Stew
MRE Cracker
Peanut Butter
Pound Cake
Fudge Brownie
Beverage Base
Acc Pkt A

Menu 2
Corned Beef Hash
FD Fruit*
MRE Cracker
Jelly
Oatmeal Cookie Bar
Cocoa Beverage
Acc Pkt B

Menu 4
Omlet w/Ham
Potato Au Gratin
MRE Cracker
Jelly
Oatmeal Cookie Bar
Candy
Cocoa Beverage
Sugar Free Beverage Base
Acc Pkt A

Menu 6
Smoky Franks
TS Fruit*
MRE Cracker
Peanut Butter
Potato Sticks
Candy
Cocoa Beverage
Sugar Free Beverage Base
Acc Pkt A

Menu 8
Ham Slice
Potato Au Gratin
MRE Cracker
Choc Cov Brownie
Cocoa Beverage
Beverage Base
Acc Pkt A

Control Menu (cont) Meal, Ready to Eat XIII

Menu 9
Pork Chow Mein
TS Fruit
MRE Cracker
Peanut Butter
Chow Mein Noodles
Choc Cov Cookie

Choc Cov Cook Beverage Base Acc Pkt A

Menu 11 Chicken w/Rice MRE Cracker Cheese Spread Choc Cov Cookie Candy Beverage Base Acc Pkt A Menu 10 Tuna w/Noodles MRE Cracker Jelly Pound Cake Candy Beverage Base Acc Pkt A

Menu 12
Escalloped Potato w/Ham
Applesauce
MRE Cracker
Cheese Spread
Choc Cov Brownie
Cocoa Beverage
Sugar Free Beverage Base
Acc Pkt A

* FD = Freeze Dried TS = Thermostabilized

Accessory Packet A: Coffee, Creamer, Sugar, Salt, Gum, Matches, Tissue, Towelette Accessory Packet B: Coffee, Creamer, Sugar, Salt, Gum, Matches, Tissue, Towelette, Candy

Each MRE contains a small bottle of Hot Sauce and FRH

Test Menu Meal, Ready to Eat

Menu 1
Teriyaki Beef
Cinnamon Apples
MRE Cracker
Jalapeno Cheese Spread
Shortbread Cookies
Chow Mein Noodles
Lemon Tea Mix
Acc Pkt A

Menu 3
Beef Enchilada
Mexican Rice
MRE Cracker
Peanut Butter
Apple Cinnamon Toaster Pastry
Corn Chips
Apple Cider Mix
Acc Pkt A

Menu 5
Salsa Chicken
White Rice
Vegetable Cracker
Straw. Jelly & Peanut Butter
Fruit Filled Bar
Beverage Base
Acc Pkt A

Menu 7
Bean & Rice Burrito
Vegetable Cracker
Jalapeno Cheese Spread
Mixed Fruit
Lemon Pound Cake
Roasted Sweetened Peanuts
Apple Cider Mix
Acc Pkt A

Menu 2
Meatloaf w/Gravy
Buttered Noodles
Vegetable Cracker
Cheddar Cheese Spread
Fudge Brownie
Beverage Base
Earl Grey Tea
Acc Pkt A

Menu 4
Spicy Oriental Chicken
White Rice
MRE Cracker
Peanut Butter
Chewy Chocolate Bar
Beef Strip Steak
Apple Cider Mix
Earl Grey Tea
Acc Pkt A

Menu 6
Pasta Prima Alfredo
Vegetable Cracker
Straw. Jelly & Peanut Butter
Fruit Filled Bar
Snack Mix
Lemon Tea Mix
Cocoa Beverage
Acc Pkt A

Menu 8
Sausage Patty
Barbeque Sauce
Vegetable Cracker
Straw. Jelly & Peanut Butter
Granola Bar
Applesauce
Apple Cider Mix
Acc Pkt A

* FD = Freeze Dried TS = Thermostabilized

Accessory Packet A: Coffee, Creamer, Sugar, Salt, Gum, Matches, Tissue, Towelette Accessory Packet B: Coffee, Creamer, Sugar, Salt, Gum, Matches, Tissue, Towelette, Candy

Each MRE contains a small bottle of Hot Sauce and FRH

Heat & Serve Ration Breakfast Menus

Control Menu

Day 1

West. Scrambled Eggs (Natick)

Ranchero Sauce

Potatoes w/Bacon Pieces

Oatmeal, Plain

Peaches

Orange Juice

Wheat Bread

Cold Cereal

Apples

PB & J *

Hot Sauce

Day 2

Creamed Ground Beef

Potatoes w/Bacon Pieces

Lemon Pound Cake

Oatmeal, Raisin & Spice

Grape Juice

Apples

W/W Bread

W/C Milk***

Day 3

Plain Waffles

Maple Syrup

Ham Slices

Apple Dessert

Pineapple Pound Cake

Orange Juice

Day 4

Scrambled Eggs w/Bacon(Natick)

Pork Sausage Links

Pears

Vanilla Pound Cake

Hot Sauce

Cold Cereal

Grape Juice

Test Menu

West. Scrambled Eggs (OFD)

Ranchero Sauce

Potatoes w/Bacon Pieces

Cream of Wheat, plain

Peaches

Orange Juice

W/W Bread**

Cold Cereal

Apples

PB & J

Ground Sausage in Gravy Potatoes w/Bacon Pieces

Lemon Pound Cake

Oatmeal, Raisin, Walnuts, & Dates

Grape Juice

Apples

W/W Bread

W/C Milk **Biscuits**

Cold Cereal

Blueberry Waffles

Maple Syrup

Ham Slices

Pineapple

Pineapple Pound Cake

Orange Juice

Cream Of Wheat, Maple & B. Sugar

Oranges

Wheat Bread

W/C Milk

Scrambled Eggs w/Bacon (OFD)

Pork Sausage Links

Pears

Vanilla Pound Cake

Tea Loaf w/Walnuts

Cold Cereal

Orange Juice

W/C Milk

W/W Bread

PB&J - Peanut Butter and Jelly

^{**} W/W - Wheat and White Bread *** W/C - White and Chocolate Milk

Heat & Serve Ration (Cont) Breakfast Menus

Day 5 Corned Beef Hash Roast Beef Hash Ham Slices Ham Slices Apple Dessert Peaches Oatmeal, Maple & B. Sugar Cream Of Wheat, Cinn & B. Sugar Lemon Pound Cake Corn Bread Orange Juice Orange Juice W/C Milk W/C Milk W/W Bread W/W Bread Apple **Oranges** Cocoa Cocoa Day 6 Plain Waffles Blueberry Waffles Maple Syrup Maple Syrup Pork Sausage Links Pork Sausage Links Peaches Blueberry Topping Lemon Pound Cake Lemon Pound Cake Grape Juice Grape Juice **Pears Oranges** W/W Bread Wheat Bread W/C Milk W/C Milk Cocoa Cocoa Day 7 West. Scrambled Eggs (Natick) West. Scrambled Eggs (OFD) Ham Slices Ham Slices Fruit Cocktail Fruit Cocktail Pineapple Pound Cake Tea Loaf w/Walnuts Grape Juice Grape Juice Wheat Bread Wheat Bread W/C Milk W/C Milk Cocoa Day 8 Creamed Ground Beef Creamed Ground Beef Potatoes w/Bacon Pieces Potatoes w/Bacon Pieces Vanilla Pound Cake Orange Pound Cake Orange Juice Orange Juice **Oranges** Apples Oatmeal, Raisin & Spice Oatmeal, Raisin Dates & Nut Oatmeal, Maple & Brown Sugar W/W Bread W/W Bread W/C Milk W/C Milk **Biscuit** Day 9 Scrambled Eggs w/Bacon & Cheese(Natick) Scrambled Eggs w/Bacon (OFD) Ranchero Sauce Salsa Ham Slices Ham Slices Apple Dessert Pineapple Vanilla Pound Cake Vanilla Pound Cake Orange Juice Orange Juice Apples Wheat Bread

W/C Milk

Oatmeal, Raisin, Dates & Nut

Heat & Serve Ration Dinner Menus

Control Menu

Day 1 Chicken Breast w/Gravy

Sweet Potatoes

Corn

Orange Pound Cake Lemon-Lime Beverage

Pears, FF*

Salad, Salad Dressing

W/C Milk PB & J

Day 2 Lasagna

Green Beans

Peaches

Orange Beverage

Apples, FF

Salad, Salad Dressing

W/W Bread W/C Milk

PB & J

Day 3 Meatballs w/Brown Gravy

White Rice

Mixed Vegetables

Chocolate Cake w/Topping

Cherry Beverage

W/W Bread

Salad, Salad Dressing

PB & J

Day 4 Boneless BBQ Pork Ribs

Hamburger Buns Red Beans & Rice

Peaches

Yellow Cake w/Topping

Cherry Beverage

White Bread

PB & J

Day 5 Beef Strips w/Peppers

Potatoes w/Butter Sauce

Green Beans

Choco Cake w/Topping

Cherry Beverage

W/W Bread

W/C Milk

Salad, Salad Dressing

PB & J

Cocoa

* FF - Fresh Fruit

Test Menu

Chicken Breast w/Gravy

Sweet Potatoes

Corn

Orange Pound Cake

Lemon-Lime Beverage

Oranges

Salad, Salad Dressing

W/W Bread

PB & J

Braised Beef w/Noodles

Green Beans

Chocolate Pudding

Cherry Beverage

Apples

Salad, Salad Dressing

W/W Bread

W/C Milk

Meatloaf, Cajun Style

Spanish Rice

Mixed Vegetables Corn Bread

Grape Beverage

Apples

W/W Bread

Salad, Salad Dressing

PB & J

Boneless BBQ Pork Ribs

Hamburger Buns

Red Beans & Rice

Choco Mint Pound Cake

Tea Loaf w/Walnuts

Cherry Pie Filling

Cherry Beverage W/W Bread

Salad

Beef Tamale Pie

Spanish Rice

Carrots

Corn Bread

Tropical Fruit Salad

Cherry Beverage

Salad, Salad Dressing

Heat & Serve Ration (Cont) Dinner Menus

Cont	rol Menu	Test Menu		
Day 6	Chicken Chow Mein Oriental Rice Green Beans Choco Cake w/Topping Cherry Beverage Salad, Salad Dressing PB & J	Chicken Teriyaki Oriental Rice Mixed Vegetables Tapioca Pudding Cherry Beverage W/W Bread W/C Milk Salad, Salad Dressing Cocoa		
Day 7	Beef Patties Hamburger Buns Pork & Beans Fruit Cocktail Cheese Spread Cherry Beverage PB & J	Beef Franfurters Pork & Beans Three Bean Salad Butterscotch Pudding Grape Beverage Salad W/W Bread W/C Milk		
Day 8	Spaghetti &Meatballs Corn Marble Cake w/Topping Cherry Beverage Salad PB & J	Chili w/Beans White Rice Corn Corn Bread Lemon-Lime Beverage Grape Beverage Pears, canned Pears, FF W/W Bread W/C Milk Salad, Salad Dressing		
Day 9	Turkey Slices w/Gravy Potatoes Diced in Butter Sauce Mixed Vegetables Yellow Cake w/Topping Blueberry Dessert Cherry Beverage PB & J	Turkey Slices w/Gravy Potatoes Diced in Butter Sauce Mixed Vegatables Tea Loaf w/Walnuts Lemon-Lime Beverage White Milk Salad, Salad Dressing		

APPENDIX B QUESTIONNAIRES

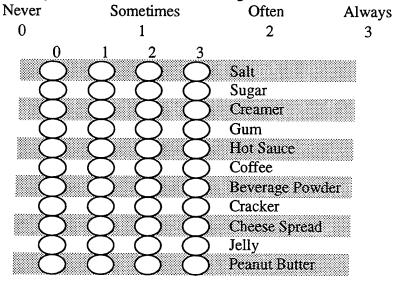
Your Initials: ID:	Please read each question carefully. Mark your answers by filling in the circle(s) next to the correct answer.
	USE A NO.2 PENCIL Proper Mark
1. Your rank: 1 2 3 4 5 6 E O O O O O O O O O O O O O O O O O O	7 8 9 2. What is your gender? Male Female
3. Have you been deployed? YES IF YES, Please fill in the circles(s) for your depl Saudi Arabia Vietnam Macedonia Grenada Panama Haiti Other	5. What is your age? years
6. What is the highest level of education you have completed? Finished grade school Some high school High school graduate or grad equivalent Some college College graduate	7. What is your ethnic background? White Black Hispanic Asian/Pacific Islander American Indian/ Alaskan Native Other (please specify)
Middle Atlantic South Atlantic (I North Central (I South Central (I Mountain (ID, V Pacific (WA, OR Other (please spe	ME, NH, VT, MA, CT, RI) (NJ, NY, PA) DE, MD, VA, WV, NC, SC, GA, FL, DC) DH, IN, IL, MI, WI, MN, IA, MO, ND, SD, NE, KS) XY, TN, AL, MS, AR, LA, OK, TX) WY, CO, MT, AZ, NM, UT, NV) L, CA, AK, HI)
GRP	Q3 Q7
Q4 0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7	0 1 2 3 4 5 6 7 8 9 Q5 Q8
O 1 •	Page B1 632
<u> </u>	34

9. Please rate the v	ariety of the fo	ood groups lis	ted below for t	he MRE.		
Extremely Too Little Variety 1	Moderately Too Little Variety 2	Slightly Too Little Variety 3	Just Right 4	Slightly Too Much Variety 5	Moderately Too Much Variety 6	Extremely Too Much Variety 7
	1 2	3 4	5 6 7		t (ratings of 1, 2, o ow to increase vari	
Entree Starches	- 85	388	388			
- Crackers Spreads						
Desserts			$\exists QQ$			
Cakes Fruits		388	388			
Snacks Drinks	-8	388	388			
Candy Overall !						

10. How many dif	ferent menus v	would you lik	e to see in the l	MRE? Please cl	noose one.	
		>	13-16 17-20			
		ξ	3 21-24			
		(25 or more	•		
11. Would you lik					ON	O ,
IF YES, what food	items would y	ou like dropp	ed from the M	RE? Please list	below.	
12. Please list food realistic.	l items you wo Entrees	uld like adde	d to the MRE i	n the following	categories. Ple	ase be
	Crackers					
i	Spreads Seasonings			THE TANK THE PARTY OF		···
	Snacks					-
	Fruit					
	Candy					
	Beverages Other					
13. Have you ever		Sauce/Tabasc	o Sauce includ	ed in the MRE?	YES	
IF YES, how on Never		asionally	Sometimes	Ofter	n Δ	lways
Ö	(\supset		Onto		O .
			Page	e B2		7923
-			35	5		

Please answer the following questions on the MRE you typically eat during field exercises.

14. Typically, how often do you use/consume the following items that are included in the MRE
--



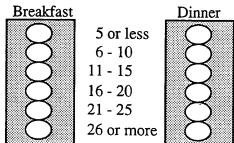
3

Please answer the following questions on the Tray Ration/Heat & Serve you typically eat during field exercises.

15. Please rate the variety of the food items in the Tray Ration/Heat & Serve.

Extremely Too Little Variety 1	Moderately Too Little Variety 2	Slightly Too Little Variety 3	Just Right 4	Slightly Too Much Variety 5	Moderately Too Much Variety 6	Extremely Too Much Variety 7
	1	2 3 4	5 6 7		(ratings of 1, 2, or w to increase varie	
Breakfast Dinner Er		388	388			
Vegetable Starches			$\overrightarrow{A}\overrightarrow{A}\overrightarrow{A}$			
Cakes Desserts			$\exists \exists \exists$			
Fruits Beverage			$\preceq \Box \Box$			
Candy Overall 7	\sim		$\exists \exists \exists \exists$			

16. How many different menus would you like to see in the Tray Ration/Heat & Serve? Please choose one for each meal.



17.	Are there	any food items	you would liked	dropped from th	e Tray Ration	n/Heat & Serve ration?
		NO	-	·	<u>-</u>	

IF YES, what food items would you like dropped from the Tray Ration/Heat & Serve ration? Please list below.

18. Please list food items you would like to see added to the Tray Ration/Heat & Serve ration in the following

catagories. Please be realistic

Ticase de realistic.	
Breakfast Entrees	
Dinner Entrees	
Vegetables	
Fruits	
Spreads	
Seasonings	
Snacks	
Candy	
Beverages	
Other	

19. How often do you use/consume the following items that are included in the Heat & Serv ratione.

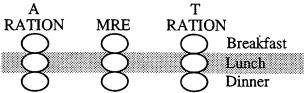
Never	Son	netimes		Often	Always
Ü		1		2	3
	0	1	2	3	
		\bigcirc () (Salt	
		\bigcirc (\supset (Sugar	
		\bigcirc	7) (Cream	T .
		\bigcap	7 (Peanut	Butter
	$\mathcal{O}_{\mathcal{I}}$	\bigcap	7) Jelly	
		\supset \subset	7 (Hot Sa	uce
		\bigcap	7	Coffee	
	\sim	\sim	\preceq ?	≺ Fruit D	rink

OVERALL

20. During a typical field exercise, what types of rations do you usually eat for the meals indicated below?

Α		\mathbf{T}	
RATION	MRE	RATION	
		O Break	fast
	\bigcirc	O Lunch	
\bigcirc		O Dinne	r

21. Typically, during active conflict or a goodwill mission, what type of rations do you eat for the meals indicated below?



22.	How do you typically heat y Do Not Heat		s Ration He		8	Heat Tab Optimus Field Kite	Stove
	Please rate how much you I DISLIKE DISLIKE VERY DISL EXTREMELY MUCH MODER	IKE DISLIKE	NIETHER LIKE NOR	LIKE	LIKE MODER ATELY	LIKE VERY MUCH I	LIKE EXTREMELY
		Dislike/Like the o	NIETHER LIKE NOR	LIKE	& Serve ration LIKE MODERATELY	LIKE VERY	LIKE EXTREMELY
	itrition Information Sec						
26.	When chosing food to eat, d (Choose only one) Do you consciously think ab rations?		Eat Eat Oth Ces you mak NO MRE		I for you lable are in the field		e following
27.	Do you consciously think at	out food choices	when you a	re NOT in th	e field?	YES	○NO
28.	How often do you read the r		on commerc Sometimes		s. ften	Always	.
29.	How confident are you in you Not At All S		nutrition? Moderately	v	ery	Extreme	ly
30.	Where do you get your nutri Magazines Newspapers Television	Fami Heal	n? Choose a lly/Friends th Profession ts/School	. Ö	SGT/Military Nutrient Labo Other	els	

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31. In terms of which foo	of nutritional co	ontent, please rate	e the IMPORTANO	CE of the following i	nutrients when chosing
	Not At All 0	Slightly Important 1	Moderately Important 2	Very Important 3	Extremely Important 4
				Calories Protein Fat Carbohydrate Cholesterol Sodium Iron Fiber Calcium Vitamin C Vitamin A B Vitamins	
Using the sam which foods to	ne scale as abov o eat.	e, rate the IMPO	RTANCE of each of 2 3 4		butes when chosing
22. Hojng the	goole below.			Taste Texture Price Brand Nutritional content Availability Habit Time of Day Family Odor Appearance How Filling	
one Tray	Ration meal/H Not Enough	eat & Serve mea	l. Just Right	Too Mu	one MRE ration and
	1	2 MRE 2 3 4	3 5	4 5 TRAY RATI 1 2 3	ON 4 5
			Calories Protein Fat Carbohydrat Cholesterol Sodium Iron Fiber Calcium Vitamin C Vitamin A B Vitamins		

33.	3. Which of the statements best defines fortified foods? Choose only one. a food which contains a natural supply of vitamins and minerals a food to which vitamins and minerals have been added a food which contains enough vitamins and minerals to meet the daily requirements a food which nonessential food components have been removed							
34.	How many calories do you think are in: One single MRE ration (complete meal) calories One single Tray Ration meal calories							
35.	How many calories PER DAY do you believe are necessary in the following situations? in garrison in the field in the desert in extreme cold weather combat while on vacation							
36.	What is the maximum total daily calories that should be provided by fats. $\begin{array}{c ccccccccccccccccccccccccccccccccccc$							
37.	What is the maximum total daily calories that should be provided by SATURATED fats. 0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100% \rightarrow \rinton \rightarrow \rightarrow \rightarrow \rightarrow \rightarrow							
38.	What is the maximum amount of cholesterol that should be consumed daily? Omg 150mg 300 mg 450 mg 600 mg 750 mg 900 mg O O O O							
39.	Identify the best source of Iron. 2% Milk Apple Hamburger Lettuce							
	Fats, carbohydrates, and protein together account for 100% of the calories in the MRE. What percent do you think each nutrient contributes to the total number of calories in the MRE.	age						
	% 0 10 20 30 40 50 60 70 80 90 100 Fat Carbohydrates Protein The sum of the three numbers should equal 100%							

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41.	Would you like nutrient information available for the: YES NO MRE Tray Ration/Heat & Serve	
	Please fill in the appropiate bubble for each statement below. (N/A = Not Applicable) YES NO I avoid certain foods due to religious, health, or medical resons. I restrict, control or limit certain foods that my family eats I eat certain foods due to religious, health, or medical reasons. I follow the same basic diet that I grew up with. I have an adequate understanding of nutrition. I typically eat snacks between meals. I am a vegetarian. I prepare the meals for my household/self. My food shopping habits have changed within the last year. My eating habits have changed within the last year. I live alone. I have eaten more than 25 MRE's. Foods that I eat affect my overall daily performance. What type of beverages do you typically drink on a daily basis? (Other than beer!)	
44.	Are you trying to gain or lose weight? Gain Lose Stay The Same	
45.	During a typical work week where do you usually eat the following meals?	
	In the Office Home Facility Resturant Resturant Other Breakfast Lunch Dinner	
46.	Please answer the following questions regarding the different food types below. Please indicate if you have ever eaten any of the following by filling in YES or NO. YES NO Freeze Dried Foods Dehydrated Foods Frozen Foods Frozen Foods Instant Foods	l

47. How much you liked the item(s) below. If you have not tried an item, tell me how much you think you would like the item. Each item below will have an acceptability rating.

DISLIKE EXTREMELY 1	DISLIKE VERY MUCH 2	DISLIKE MODERATLEY 3	DISLIKE SLIGHTLY 4	NIETHER LIKE NOR DISLIKE 5	LIKE SLIGHTLY 6	LIKE MODERATELY 7	LIKE VERY MUCH 8	LIKE EXTREMELY 9
-	<u> </u>		\$ 5 6 8 5 6 8 6 6		Del Car Ins	eze Dried Food hydrated Foods nned Foods tant Foods zen Foods	-	`

48. The nutrition label below describes the nutrition information for a loaf of bread. If you ate the entire loaf, would you exceed the maximum recommended daily intake of saturated fat based on a 2,500 calorie/day diet?

ulet?											
Nutrition Facts											
Serving Size 28g											
	Servings per container 20										
Servings per container 20											
Amount per serving 1 Slice											
Calories 80											
Calories from fat	9										
	% Daily Value*										
Total fat 1g											
Saturated fat 1g	3%										
Cholesterol 0mg	0%										
Sodium 200mg	8%										
Total carbohydrate	: 13g 9%										
Dietary fiber 1g	6%										
Sugars 1g											
Protein 3g											
Vitamin A	0% Vitamin C 0%										
Calcium 1:	5% Iron 10%										
* Percent Daily Value	es are based on a 2,000										
calorie diet. Your dail	y values may be higher										
or lower based on you	r calorie needs:										
	Calories: 2,000 2,500										
Total fat	Less than 65g 80g										
Sat fat	Less than 20g 25g										
Cholesterol	Less than 300mg 300mg										
Sodium	Less than 2400mg 2400mg										
Total Carbohydrate	300g 375g										
Dietary Fiber	25g 30g										
Calories per gram:											
Fat 9 Carbohydrate 4 Protein 4											
- = > Carbonya	THE THOUSE TO SERVICE										

OTHER																			
SLEEP SHIRT	YES	Q	YES	<u>Q</u>	YES	QV	YES	<u>Q</u>	YES	<u>Q</u>	YES	2	YES	<u>Q</u>	YES	Q	YES	8	YES
FIELD JACKET AND/OR LINER	JACKET Y N	LINER Y N	JACKET Y N	LINER Y N	JACKET Y N	LINER Y N	JACKET Y N	LINER Y N	JACKET Y N	LINER Y N	JACKET Y N	LINER Y N	JACKET Y N	LINER Y N	JACKET Y N	LINER Y N	JACKET Y N	LINER Y N	JACKET Y N
LONGJOHN TOP/BOTTOM	TOP	NONE	TOP	BOLTOM	TOP	BOITOM	TOP	NONE	TOP	NONE	TOP	NONE	TOP	NONE	TOP	NONE	TOP	NONE	TOP
BELT	YES	<u>Q</u>	YES	<u>Q</u>	YES	2	YES	<u>Q</u>	YES	Q	YES	<u>Q</u>	YES	Q	YES -	Q.	YES	Q.	YES
UNDERWEAR	T-SHIRT Y N	SHORTS Y N	T-SHIRT Y N	SHORTS Y N	T-SHIRT Y N	SHORTS Y N	T-SHIRT Y N	SHORTS Y N	T-SHIRT Y N	SHORTS Y N	T-SHIRT Y N	SHORTS Y N	T-SHIRT Y N	SHORTS Y N	T-SHIRT Y N	SHORTS Y N	T-SHIRT Y N	SHORTS Y N	T-SHIRT Y N
U BOT. TOM	HOT	NONE	HOT	NONE	HOT	NONE	HOT	NONE	HOT	NONE	HOT	NONE	HOT	NONE	HOT	NONE	HOT COLD	NONE	HOT
BDU TOP I	HOT	NONE	HOT	NONE	HOT	NONE	HOT	NONE	HOT	NONE	HOT	NONE	HOT	NONE	HOT		HOT	NONE	HOT
SOCKS	PAIRS WOOL	SPORT	PAIRS	SPORT	PAIRS WOO!	SPORT	PAIRS WOOL	SPORT	PAIRS	WOOL SPORT	PAIRS	WOOL SPORT	PAIRS WOO!	SPORT	PAIRS	SPORT	PAIRS WOOI	SPORT	PAIRS WOO!
BOOTS	CORCORAN JUNGLE	COMBAT	CORCORAN JUNGLE	COMBAT	CORCORAN JUNGLE	COMBAT	CORCORAN	COMBAT	CORCORAN JUNGLE	COMBAT	CORCORAN JUNGLE	COMBAT	CORCORAN	COMBAI	CORCORAN	COMBAT	CORCORAN	COMBAT	CORCORAN
WEIGHT																			
DAY GROUP													-						

ID:			
DA'	ΓΕ/DAY:		

1. Use the scale below to rate your hunger <u>BEFORE</u> this meal. (circle one)

			SOMEWHAT HUNGRY	T MODERATELY HUNGRY			Y		VERY UNG			EXTREM HUNG				
FOOD	in the	e following information fo	or the foods you	ı ate at	this M	RE n	neal.	V INVESTIGATION OF	DISLIKE EATREMELT DISLIKE VERY MUCH DISTIKE MODEPATETV	DISLIKE SLICHTLY NEITHER LIKE/DISLIKE	LIKE SLIGHTLY LIKE MODERATELY	LIKE VERY MUCH LIKE EXTREMELY	DID HEA		DID NOT LIKE NOT HUNGRY TRADED / GAVE AWAY	jr.
TYPE	C	CODE FOOD ITEM		AMO	UNT	EATE	EN	1 1312		DISLIKE S	LIKE	KE	THE I		NOT RAI	OTHER
ENTREES	01 02 03 04 05 06 07 08 09 10 11	Pork w/Rice Corned Beef Hash Chicken Stew Omelet w/Ham Spaghetti w/Meat Sauce Smoky Franks Beef Stew Ham Slices Pork Chow Mein Tuna w/Noodles Chicken w/Rice Esc. Potatoes w/Ham	0 0 0 0 0 0 0 0 0	1/4 1 1/4 1	/2 3/4 /2 3/4 /2 3/4 /2 3/4 /2 3/4 /2 3/4 /2 3/4 /2 3/4 /2 3/4	1 or		1 1 1 1 1 1 1 1	2 3 2 3 2 3 2 3 2 3 2 3 2 3 2 3 2 3 2 3	4 5 6 4 5 6 4 5 6 4 5 6 4 5 6 4 5 6 4 5 6 6 4 5 6 6 4 5 6 6 4 5 6 6 6 6	6 7 8 6 7 8	3 9 3 9 3 9 3 9 3 9 3 9 3 9 3 9	YES	NO N	A B C C C A B C C C A B C C C A B C C C A B C C C C	000000000
STARCHES	20 21 22	Chow Mein Noodles Potato Au Gratin MRE Cracker	0	1/4 1, 1/4 1, 1/4 1,	/2 3/4	1 or		1	2 3	4 5 6 4 5 6 4 5 6	578	9	YES YES YES	NO NO NO	A B C A B C A B C	D
SPREADS	30 31 32	Cheese Spread Jelly Peanut Butter	0	1/4 1/ 1/4 1/ 1/4 1/	2 3/4	1 or		1	2 3	4 5 6 4 5 6 4 5 6	5 7 8	9	YES YES YES	NO NO NO	A B C A B C A B C	D
SNACKS	40 41 42 43 44	Oatmeal Cookie Bar Potato Stick Chocolate Covered Cool Pound Cake Chocolate Covered Brow	0 kie 0 0	1/4 1/ 1/4 1/ 1/4 1/ 1/4 1/ 1/4 1/	/2 3/4 /2 3/4 /2 3/4	1 or 1 or 1 or		1 1 1	2 3 2 3 2 3	4 5 6 4 5 6 4 5 6 4 5 6	5 7 8 5 7 8 5 7 8	9 9 9	YES YES YES YES YES	NO NO NO NO NO	A B C I A B C I A B C I A B C I	D D D
DRINKS	50 51 52 53	Beverage w/Sugar Sugar Free Beverage Coffee Cocoa	0 0	1/4 1/ 1/4 1/ 1/4 1/ 1/4 1/	2 3/4 2 3/4	1 or 1 or	_	1 1	2 3 2 3	4 5 6 4 5 6 4 5 6 4 5 6	7 8	9 9	YES YES YES YES	NO NO NO NO	A B C I A B C I A B C I	D D
FRUIT	60 61 62	Freeze Dried Fruit Wet Pack Fruit Applesauce	0	1/4 1/ 1/4 1/ 1/4 1/	2 3/4	1 or		1	2 3	4 5 6 4 5 6 4 5 6	7 8	9	YES YES YES	NO NO NO	A B C I A B C I A B C I	D
CANDY	70 71 72 73 74	Charms M&M's Chocolate Bar Vanilla Caramels Tootsie Rolls	0 0 0	1/4 1/2 1/4 1/2 1/4 1/2 1/4 1/2 1/4 1/2	2 3/4 2 3/4 2 3/4	1 or 1 or 1 or		1 1 1	2 3 2 3 2 3	4 5 6 4 5 6 4 5 6 4 5 6 4 5 6	7 8 7 8 7 8	9 9 9	YES YES YES YES YES	NO NO NO NO NO	A B C I A B C I A B C I A B C I A B C I	D D D
ACCESSORY PACKET ITEMS	81 82 83	Salt Cream Sugar Gum Hot Sauce	0 0 0	1/4 1/2 1/4 1/2 1/4 1/2 1/4 1/2 1/4 1/2	2 3/4 2 3/4 2 3/4	1 or 1 or 1 or	_	1 1 1	2 3 2 3 2 3	4 5 6 4 5 6 4 5 6 4 5 6 4 5 6	7 8 7 8 7 8	9 9 9	YES YES YES YES YES	NO NO NO NO	A B C I A B C I A B C I A B C I A B C I	D D D
	**	OVERALL MEAL						1	2 3	456	7 8	9		(OV	ER)	

3.	Rate the amount of	food you received in th	nis MRE meal. (cir	cle one	e)							
	MUCH TOO LITTLE	MODERATELY TOO LITTLE	SOMEWHAT TOO LITTLE	:	JUST RIGHT			WHAT MUCH		ODERATI OO MUC		MUCH TOO MUCH
4.	Rate the temperature	e of your MRE entree	after heating. (circ	le one)							
	MUCH TOO COLD	MODERATELY TOO COLD	SOMEWHAT TOO COLD		JUST RIGHT		OME' TOO I	WHAT HOT		DERATE OO HOT	LY	MUCH TOO HOT
5.	Rate your hunger A	FTER this meal. (circ	le one)									
	NOT AT HUNG		EWHAT NGRY		ERATI JNGRY			VERY HUNGI			TREMI UNGR	
6.	Please estimate the a more than 2 quarts of	amount of water you d of water during any on	rank or added to yo e period, write in t	our MF he tota	RE food I amoun	t on th	e line	during e provided. of water			ted belo	ow. If you drank
	HERMI VOLID VA											
	WITH YOUR MR		0	1/4	1/2	3/4	1	1 1/4	1 1/2	1 3/4	2	MORE THAN 2
		AKFAST AND LUNC		1/4	1/2	3/4	1	1 1/4	1 1/2	1 3/4	2	MORE THAN 2
		CH AND DINNER IER AND BREAKFA	0 ST 0	1/4 1/4	1/2 1/2	3/4 3/4	1 1	1 1/4 1 1/4	1 1/2 1 1/2	1 3/4 1 3/4	2 2	MORE THAN 2 MORE THAN 2
	DD1 W DDIN DHIIN	EK AND DILLAM A	31 0	1/4	1/2	3/4	1	1 1/4	1 1/2	1 3/4	2	MORE THAN 2
7.	Please list any non-l	MRE and non-Heat &	Serve food items y	ou ate	today.							
	F	FOOD		- A	MOUN	T	_		T.	IME		
							- - -	_				
							-	-				

ID:		•
DA	TE/DAY:	

1. Use the scale below to rate your hunger <u>BEFORE</u> this meal. (circle one)

	NOT AT ALL HUNGRY	SOMEWHAT HUNGRY		DERATELY UNGRY	VEI HUN		EXTREM HUNG		
 Please fill in FOOD TYPE 	the following information		u ate at this MF		DISLIKE EXTREMELY DISLIKE VERY MUCH DISLIKE MODERATELY DISLIKE SLIGHTLY	NEITHER LIKE/DISLIKE LIKE SLIGHTLY LIKE MODERATELY LIKE VERY MUCH LIKE EXTREMELY	DID '	T	DID NOT LIKE NOT HUNGRY TRADED / GAVE AWAY OTHER
ENTREES	01 Teriyaki Beef 02 Meatloaf w/Gra 03 Beef Enchilada: 04 Spicy Oriental 0 05 Salsa Chicken 06 Pasta Primavera 07 Black Beans & 08 Sausage Patty	ovy 0 s 0 Chicken 0 a Alfredo 0 Rice Burrito 0) 1/4 1/2 3/4) 1/4 1/2 3/4	1 or 1 or 1 or 1 or 1 or 1 or 1 or	1 2 3 4 2 1 2 3 4 2 1 2 3 4 2 1 2 3 4 2 1 2 3 4 2	5 6 7 8 9 5 6 7 8 9	THE IT YES	NO NO NO NO NO NO NO NO	A B C D A B C D
STARCHES	10 Chow Mein No 11 Buttered Noodle 12 Mexican Rice 13 White Rice	es 0 0	1/4 1/2 3/4 1 1/4 1/2 3/4 1 1/4 1/2 3/4 1 1/4 1/2 3/4	1 or 1 or	1 2 3 4 5 1 2 3 4 5 1 2 3 4 5 1 2 3 4 5	5 6 7 8 9 5 6 7 8 9	YES YES YES YES	NO NO NO	A B C D A B C D A B C D A B C D
CRACKERS	16 Vegetable MRE17 MRE Cracker		1/4 1/2 3/4 1/4 1/2 3/4		1 2 3 4 5 1 2 3 4 5		YES YES	NO NO	A B C D A B C D
SPREADS	20 Cheddar Cheese21 Jalepeno Cheese22 Strawberry Jam23 Peanut Butter	e Spread 0	1/4 1/2 3/4 1/4 1/2 3/4 1/4 1/2 3/4 1/4 1/2 3/4	1 or 1 or	1 2 3 4 5 1 2 3 4 5 1 2 3 4 5 1 2 3 4 5	6789	YES YES YES YES	NO NO NO	A B C D A B C D A B C D A B C D
SNACKS	30 Corn Chips31 Beef Jerky32 Snack Mix33 Roasted Peanuts	0	1/4 1/2 3/4 1/4 1/2 3/4 1/4 1/2 3/4 1/4 1/2 3/4	l or l or	1 2 3 4 5 1 2 3 4 5 1 2 3 4 5 1 2 3 4 5	6789	YES YES YES YES	NO NO NO	A B C D A B C D A B C D A B C D
PASTRIES	 40 Lemon Pound C 41 Shortbread Cool 42 Fudge Brownie 43 Apple Cinnamo 44 Chewy Chocola 	kies 0 0 n Toaster Pastry 0	1/4 1/2 3/4 1/4 1/2 3/4 1/4 1/2 3/4 1/4 1/2 3/4 1/4 1/2 3/4	l or l or l or	1 2 3 4 5 1 2 3 4 5 1 2 3 4 5 1 2 3 4 5 1 2 3 4 5	6789	YES YES YES YES YES	NO NO NO NO	A B C D A B C D A B C D A B C D A B C D
FRUIT BARS	50 Apple Fruit Fille51 Blueberry Fruit52 Strawberry Fruit	Filled Bar 0	1/4 1/2 3/4 1 1/4 1/2 3/4 1 1/4 1/2 3/4 1	or	1 2 3 4 5 1 2 3 4 5 1 2 3 4 5	6789	YES YES YES	NO NO NO	A B C D A B C D A B C D
GRANOLA BARS	55 Peanut Butter G56 Chocolate Chip57 Honey Nut Gran	Granola Bar 0	1/4 1/2 3/4 1 1/4 1/2 3/4 1 1/4 1/2 3/4 1	or	1 2 3 4 5 1 2 3 4 5 1 2 3 4 5	6789	YES YES YES	NO NO NO	A B C D A B C D A B C D
FRUITS	60 Cinnamon Apple61 Fruit Mix62 Applesauce	0	1/4 1/2 3/4 1 1/4 1/2 3/4 1 1/4 1/2 3/4 1	or	1 2 3 4 5 1 2 3 4 5 1 2 3 4 5	6789	YES YES YES	NO NO NO	A B C D A B C D A B C D
DRINKS	70 Lemon Tea 71 Lemon-Lime Be 72 Grape Beverage 73 Apple Cider 74 Coffee 75 English Tea Tim 76 Earl Grey Tea 77 Cocoa	verage 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	1/4 1/2 3/4 1 1/4 1/2 3/4 1	or or or or	1 2 3 4 5 1 2 3 4 5	6 7 8 9 6 7 8 9	YES	NO	A B C D A B C D A B C D A B C D A B C D A B C D A B C D A B C D A B C D ER)

FOOD TYPE SAUCES	CODE 80 81	FOOD ITEM BBQ Sauce Hot Sauce	AMOUN 0 1/4 1/2	3/4	1 or _			4 5 6	5789		DID YOU HEAT THE ITE	M ?	P DID NOT LIKE WE NOT HUNGRY O TRADED / GAVE AWA
ACCESS PACKET ITEMS	SORY 82	Salt Cream Sugar Gum	0 1/4 1/2 0 1/4 1/2 0 1/4 1/2 0 1/4 1/2 0 1/4 1/2	3/4 3/4 3/4	1 or _ 1 or _ 1 or _		1 2 3 1 2 3 1 2 3	4 5 6 4 5 6 4 5 6	5 7 8 9 5 7 8 9 5 7 8 9 5 7 8 9 5 7 8 9		YES N YES N YES N YES N	0 0 0	A B C D A B C D A B C D A B C D A B C D A B C D
-	**	OVERALL MEA	L				123	4 5 (5 7 8 9				
	he amount o MUCH DO LITTLE	of food you receive MODERATE TOO LITTLE	LY SOMEV	· VHA7	Γ	e) JUST RIGHT			EWHAT MUCH		ODERAT 'OO MUC		MUCH TOO MUCH
	he temperat MUCH OO COLD	ure of your MRE e MODERATEI TOO COLD		VHA7	•	e) JUST RIGHT		SOME TOO	WHAT HOT		ODERATE OO HOT	ELY	MUCH TOO HOT
5. Rate y	our hunger	AFTER this meal.	(circle one)										
	NOT A HUN	T ALL IGRY	SOMEWHAT HUNGRY			DERAT JNGRY			VERY			TREMI UNGR	
6. Please	estimate th	e amount of water s of water during a	you drank or add ny one period, wi	ed to	your Mi	RE food	d or be	verages ne line	s during e provided.	ach time	period lis	ted belo	ow. If you drank
		Time Periods					A	mount	of water	(QUAR	TS)		
WIT	H YOUR M	IRE		0	1/4	1/2	3/4	1	1 1/4	1 1/2	1 3/4	2	MORE THAN 2
BET	WEEN LU	EAKFAST AND L NCH AND DINNI INER AND BREA	ER	0 0 0	1/4 1/4 1/4	1/2 1/2 1/2	3/4 3/4 3/4	1 1 1	1 1/4 1 1/4 1 1/4	1 1/2 1 1/2 1 1/2	1 3/4 1 3/4 1 3/4	2 2 2	MORE THAN 2 MORE THAN 2 MORE THAN 2
7. Please	list any nor	-MRE and non-He	eat & Serve food	items	you ate	today.							
		FOOD	<u>-</u>			MOUN	NT	_	_	7	TME		
			- - -					- - 	- - 				·

ID			BREAKFAST ACCE	PTABILITY	C
Name			Please use the follow	ing scale to	
Day/Date			rate the food you ate		
DID DISLIKE EAT EXTREMELY 0 1	DISLIKE VERY DISLIKE MUCH MODERATLEY 2 3	DISLIKE LIKE SLIGHTLY DISL 4 5	NOR LIKE LIK IKE SLIGHTLY MODER		
Breakfast Items	Waffles Maple Syrup Pork Sausage Links		1 2 3 4	5 6 7 8 9))
Fruit/Cake	Lemon Pound Cake Peaches	8	88888	38888)
Oatmeal	Kind:	_ 0	00000	0000	
Fresh Fruit	Apple Orange Pear Banana			38888	
Cereal	Kind:	_ 0	00000	0000	_
Bread	Wheat White Rye	8	88888	38888	
Beverages	Orange Juice Grape Juice Coffee Cocoa White Milk Chocolate Milk	00000			
Condiments	Peanut Butter Jelly Hot Sauce	8	88888	38888	
Other		8	88888	38888	
Group E C T D	8 9 0 1 2 3 4 5	DO NOT WRITE B 9 10 D 0 1	ELOW LINE 2 3 4 5 6 7 8 9 2 3 4 5 6 7 8 9	CEREAL 0 1 2 3 4 5 6 7 8 O 1 2 3 4 5 6 7 8	
)		Pa	age B5	9383	_

Please rate the a	mount of food yo	ou received in t	his meal.			
Much	Moderately	Somewhat	Just	Somewhat	Moderately	Much
Too Little	Too Little	Too Little	Right	Too Much	Too Much	Too Much
			\bigcirc	<u> </u>	\cup	\bigcirc
Using the scale	below, rate the o	verall tempera	ture of the follo	wing foods.		·
Extremely Cold	Moderately Cold	Somewhat Cold	Neither Hot nor Cold	Somewhat Hot	Moderately Hot	Extremely Hot
1	2	3	4	5	6	7
Was your food t	Entred Meat Potate Oatm Hot D	Side Dish pes eal Orink				
Much Too Cold	Moderately Too Cold 2	Somewhat Too Cold	Just Right 4	Somewhat Too Hot 5	Moderately Too Hot 6	Much Too Hot 7
	Entre Meat Potato Oatin Hot D	Side Dish bes eal			7	, ,

Name:			Dinner Acceptat						
ID: Date:	•								
DID NOT DISLIKE EXTREMELY 0 1	DISLIKE VERY DISLIKE	NIETH	ER IOR · LIKE	LIKE LIKE VERY	LIKE EXTREMELY 9				
ENTREE	Cajun Style Meatloa Spanish Rice Mixed Vegetables Corn Bread			4 5 6 7 8 8 8 8					
DESSERT	Other:	_ 8	388	38888	388				
SALAD	Salad Salad Dressing	8	888	38888	388				
FRESH FRUIT	Apple Orange Pear Banana		888		388				
BREAD	White Wheat	8	888	38888	888				
BEVERAGES	Grape Beverage Coffee Cocoa White Milk Chocolate Milk								
CONDIMENTS	Peanut Butter Jelly Hot Sauce Other:								
OTHER		8	888	3888	888				
Group E C T	Day 1 2 3 4 5 6 7 8 9 8 9 0 1 2 3 4 5	10	ID 8 4 5 6 7 8 9 2 3 4 5 6 7 8	Salad Dre 0 1 2 3 4 5 9 0 1 2 3 4 5	6 7 8 9				

Please rate the ar	mount of food yo	ou received in t	his meal.			
Much Too Little	Moderately Too Little	Somewhat Too Little	Just	Somewhat Too Much	Moderately Too Much	Much
100 Little	Too Little	100 Little	Right	Too Much	Too Much	Too Much
Using the scale t Extremely	pelow, rate the o Moderately	verall temperat Somewhat	ture of the follo Neither Hot	wing foods. Somewhat	Madamatalı	Eutromolu
Cold	Cold	Cold	nor Cold	Hot	Moderately Hot	Extremely Hot
1	2	3	4	5	- 6	7
	Entre	ee 🗀				
	Vege	02090000000000000000000000000000000000			3	
	Potat Hot I	o/Rice ====================================			\langle	
					<i>J</i> i	
W			9			
Much	oo cold, too hot. Moderately	Somewhat	Just	Somewhat	Moderately	Much
Too Cold 1	Too Cold	Too Cold	Right 4	Too Hot	Too Hot	Too Hot 7
		1	2 3 4		7	,
	Entre		2QQ	2QQ	\mathbf{Q}	
	Vegei Potat	o/Rice	}\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\	∛\X\X\}	⊰	
	Hot I		300C	300c	3	
What was your	activity level tod	ay?				
	Very	T:-1-4	Madest	TT	Very	
	Light	Light	Moderate	Heavy	Heavy	•
					\bigcirc	

						G 0	WHITE WHEAT					
1					1	<]
10 d d 0 V 0 d d 0 V 0 d d 0 V 0 D d 0 V 0 d d 0 V 0 D d 0 V						۵	ITE WHEAT				-	
9 4 0 V 9 4 0				<u> </u>		 	++					
9 4 0 V 9 4 0							WHITE WHE					
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V							WHITE					
V						1 1	WHEAT					
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VMHIE WHEAT WHITE WHITE WHEAT WHITE WHITE WHEAT WHITE WH						۵	IE WHEAT					
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A O P B A O P						0	HITE WHEAT					
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A O P B A O P B A O O P B B A O O P B B A O O P B B A O O D D B B A O O D D D D D D D D D D D D D D D D D						+	WHEAT					
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A O P B B Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y							E WHEAT					
						0	HITE WHEAT	,				
		99	ម្			-	\$					AT
AMY AMBLED I OTATOES OTATOES BREAD BREAD BREAD AMATER AMATER AMO WHI		LED E	ISAUC	POTATOES	PEACHES	FRESH FRUIT	EAD	BEVERAGE	TER	EAL	OATMEAL	Э МНЕ.
DAY COMPANY SCRAMBLED EGG RANCH SAUCE POTATOES PEACHES PEACHES BREAD BREAD BREAD CEREAL CEREAL CATMEAL	AY EAL OMFANY	CRAMB	RANCE	POTA	PEA	FRESH	BR	BEVE	WA	CER	OAT	REAM

ID:	
BATTERY.	

Test Final Questionnaire



Thank You for participating in the ration evaluation. This is the final questionnaire and chance for you to give your opinions of the food items you ate over the last 10 days. All answers will be kept confidential. Again, Thank You.

Heat & Serve Ration Section

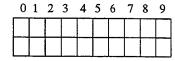
1. Of the Heat & Serve food items you ate this week which food items would you LIKE included in the Heat & Serve menus?

2. Of the Heat & Serve food items you ate this week which food items would you NOT like included in the Heat & Serve menus?

3. Rate the variety of the food groups listed below for the Heat & Serve. Extremely Moderately Slightly Slightly

Extremely	Moderately	Slightly		Slightly	Moderately	Extremely
Too Little	Too Little	Too Little	Just	Too Much	Too Much	Too Much
Variety	Variety	Variety	Right	Variety	Variety	Variety
1	2	3	4	5	6	7
		1 2 3	4 5 6	7		
		OOO		Breakfas	t Entrees	
	,	OOO	500) Oinner E	ntrees	
		000	$\supset \subset \subset$	Vegetabl	es	
		OOO	500	Starches		
		$\bigcap\bigcap\bigcap$	$\supset \subset \subset$	Cakes		
		abla abl	ろろろ	Desserts		
	,	$ \bigcap \bigcap \bigcap $	$\supset \subset \subset$	Fruits		
		abla A a b a	$\supset \subset \subset$	Beverage	S	
	,	abla abl	$\supset \subset \subset$	Candy	***************************************	
		to ot ot ot ot ot ot ot ot ot	times	Avarali E	Inst P. Comes	

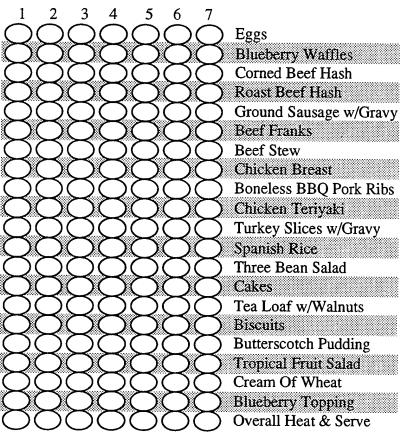
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4. Please rate the portion sizes of the food items below.

Moderately	Somewhat	Just	Somewhat	Moderately	Much
Foo Small	Too Small	Right	Too Large	Too Large	Too Large
2	3	4	5	6	7



5. How do you think the Heat & Serve ration can be improved?

MRE Section

7. Of the MRE food items you are this week which food items would you NOT like included in the MRE menus? Please list items below.

8. Was there enough food in one MRE ration to satisfy your hunger? IF NO, what would you change?

YES

ON

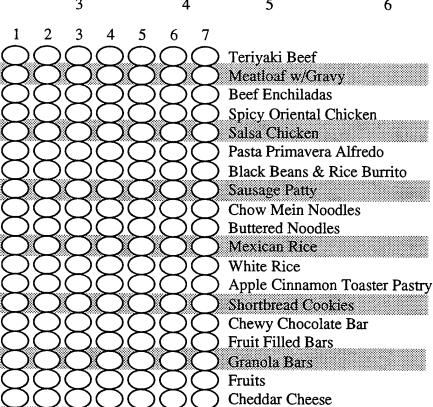
9. Please rate the portion sizes of the food items below.

Much	Moderately
Too Small	Too Small
1	2

Somewhat Just Too Small Right Somewhat Too Large

Moderately Too Large

Much Too Large



Jalepeno Cheese Strawberry Jam BBQ Sauce Hot Sauce Beverages 10. Do you have any comments on the MRE packaging?

11. Rate the variety of the food items in the MRE ration you ate during this evaluation.

Extremely Too Little Variety 1	Moderately Too Little Variety 2	Slightly Too Little Variety 3	Just Right 4	Slightly Too Much Variety 5	Moderately Too Much Variety 6	Extremely Too Much Variety 7
	1	2 3 4	5 6 7			
	\mathcal{A}	$\mathcal{L}\mathcal{L}\mathcal{L}\mathcal{L}\mathcal{L}\mathcal{L}\mathcal{L}\mathcal{L}\mathcal{L}\mathcal{L}$	$\mathcal{A}\mathcal{Q}\mathcal{Q}$	Entrees		
	\sim	>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>	$\prec \! \! \! \! \! \! \! \! \! \! \! \! \! \! \! \! \! \! \!$) Rice) Crackers		
	\simeq	\bowtie	$\prec \succ \prec$) Spreads		
	\sim	$\mathcal{C}\mathcal{C}\mathcal{C}\mathcal{C}\mathcal{C}\mathcal{C}\mathcal{C}\mathcal{C}\mathcal{C}\mathcal{C}$	$\prec \prec \prec \prec$) Snacks		
	\bigcirc		$\supset \subset \subset$) Pastries		
		000	DCC) Fruit Bars		
	Q	QQQ) Granola Bars		
	$\mathcal{Q}^{(i)}$	QQQ	$\mathcal{Q}\mathcal{Q}$) Desserts		
	\mathcal{L}	$\mathcal{A}\mathcal{A}\mathcal{A}$	$\mathcal{A}\mathcal{A}\mathcal{A}$) Fruits		
	$\mathcal{A}_{\mathcal{A}}$	HHH	222) Cakes		
	\sim	\times	$\prec \sim$	Candy Beverages		
		$\prec \prec \prec \prec \prec \prec$	$\prec \prec \prec$	Overall MRE		

12. Were any of the food items damaged? YES IF YES, which items and where did you store that ration?

ONO

	12 menus ng items		in the MF	Æ, how n	nany MRE	menus	would you	like each of	the	0
	None O			3/4	Ic C B B A	offee everage	(powder) Powder (S	• .		,
Hot Sauce	e Section	n								
14. Rate the Very Poor	Mod	ng characto lerately oor 2	eristics of Slightl Poor 3	y Ne	hot sauce either Poor Ior Good 4		ner. Slightly Good 5	Moderatel Good 6		ery ood 7
Ease of op Ease of po Durability Taste of t	ouring y of pack			\$ 5 \$ 8 \$ 8			explain any r ood" (ratings	atings below "N of 1,2, or 3)	Neither Poor	- - -
15. Rate the	e durabili Not a Dura 0	t All Sable	Somewhat Durable 1	t M	for field upderately Durable 2	V	Yery urable 3	Extremely Durable 4	,	
16. Rate the Extremely Inappropriate 1	Mode e Inappr	rately		nt Neitheriate No.	er Inappropri r Appropri 4	priate iate	Somewhat Appropriat 5 6 7		•	Extremely appropriate 7
17. Where the IF YES	here any 5, please e		while ope	ning the p	ouch hot	sauce co	ontainer? (YES		
	ne pouch l , please e		container	adequate :	for field u	se?	YES		1O	

Page FT 5

19.	How did you open the poucl using hands	h hot sauce container? with knife	Choose all the apply. using teeth	Other:	
20.	Did the pouch hot sauce spil	ll/splash from the contain	iner while you were op	pening it? YES	
21.	How often did the hot sauce Once	spill/splash while open 2-5 times	oing it? 6-9 times	IF NO, goto Everytime	Q23
22.	Was the spilling/splashing a	problem?	YES NO		
23.	Would you liked a hot sauce	container that can be re	eclosed?	YES NO	
24.	Which container do you pref	GLASS POUCH			
25.	Please rate the strength of your Very Small Preference	our preference for the co Slight Preference	ontainer you chose? Moderate Preference	Strong Preference	v
26.	Do you have any further com	nments on the MRE rati	on?		
27.	Do you have any further com	uments on the Heat & So	erve ration?		
28.	Do you have any further com	ments on the Hot Sauce	e container?		

ID:	
RATTERV.	



Final Questionnaire
Thank You for participating in the ration evaluation. This is the final questionnaire and chance for you to give your opinions of the food items you ate over the last 10 days. All answers will be kept confidential. Again, Thank You.

Heat & Serve Ration Section

1. Of the Heat & Serve food items you ate this week which food items would you LIKE included in the Heat & Serve menus?

2. Of the Heat & Serve food items you ate this week which food items would you NOT like included in the Heat & Serve menus?

3. Rate the variety of the food groups listed below for the Heat & Serve. Extremely Moderately Slightly

Extremely	Moderately	Slightly		Slightly	Moderately	Extremely
Too Little	Too Little	Too Little	Just	Too Much	Too Much	Too Much
Variety	Variety	Variety	Right	Variety	Variety	Variety
1	2	3	4	5	6	7
		1 2 3	4 5 6	7		
		OOO	$\bigcirc\bigcirc\bigcirc$	Breakfas:	t Entrees	
		OOO	OOO	Dinner E	ntrees	
		000	$\bigcirc\bigcirc\bigcirc$	Vegetabl	es	
			OOO	Starches		
	·	$\bigcirc\bigcirc\bigcirc\bigcirc$	$\cap \cap \cap$	Cakes		
		$\bigcirc\bigcirc\bigcirc$		Desserts		
	·	$ \mathcal{O}\mathcal{O}\mathcal{O} $	$\bigcap \bigcap \bigcap$	Fruits		
		$ abla \mathcal{D} \mathcal{D} \mathcal{D} $	ろろろ	Beverage	'S	
	·	abla abl	abla abl	Candy		
	8	to ot ot ot ot ot ot ot ot ot	times	March E	Inst & Come	

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	0	1	2	3	4	5	6	7	8	9
			1							
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ı			Ц				٠		L	



4. Please rate the portion sizes of the food items below.

Much Too Small

1

Moderately Too Small 2	Somewhat Too Small 3	Just Right 4	Somewhat Moderated Too Large 5
	2 3 4 5	5 6 7 3 6 7 3 6 7	Eggs Waffles Corned Beef Hash
			Creamed Ground Beef Pork Sausage Links Gatmeal Chicken Chow Mein
			Beef Patties Spaghetti w/Meatballs Turkey Slices w/Gravy Beef Stew
8	3885		Chicken Breast w/Gravy Lasagna w/Meat Sauce Meatballs w/Brown Gravy Boneless BBQ Pork Ribs
			Beef Strips w/Peppers Cakes Vegetables Red Beans & Rice
			White Rice Blueberry Dessert Fruit Cocktail Cheese Spread
$\mathcal{O}($	$\mathcal{I}(\mathcal{I}(\mathcal{I}))$		Overall Heat & Serve

5. How do you think the Heat & Serve ration can be improved?

Much

Too Large

MRE Section

6. Of the MRE food items you are this week which food items would you LIKE included in the MRE menus? Please list the items below.

7. Of the MRE food items you ate this week which food items would you NOT like included in the MRE menus?

8. Was there enough food in one MRE ration to satisfy your hunger? IF NO, what would you change?

YES

ОИ

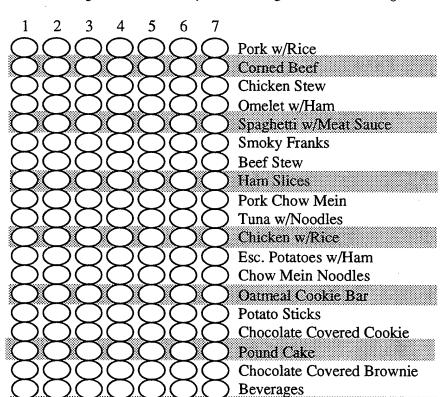
9. Please rate the portion sizes of the food items below.

M	luch	
Too	Small	
	1	

Moderately Too Small Somewhat Too Small

Just Right 4 Somewhat Too Large Moderately Too Large

Much Too Large



Coffee

10. Do you have any comments on the MRE packaging?

11. Rate the variety of the food items in the MRE ration you ate during this evaluation.

Extremely Too Little Variety 1	Moderately Too Little Variety 2	Slightly Too Little Variety 3	Just Right 4	Slightly Too Much Variety 5	Moderately Too Much Variety 6	Extremely Too Much Variety 7
	1	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	5 6 7			
	\mathcal{Q}^{0}	QQQ	$\mathcal{Q}\mathcal{Q}$) Entrees		
	\mathcal{Q}^{0}	$\mathcal{A}\mathcal{Q}\mathcal{Q}$) Rice		
	\mathcal{Q}^{0}	$\mathcal{Q}\mathcal{Q}\mathcal{Q}$	$\mathcal{I} \mathcal{I} \mathcal{I} \mathcal{I}$) Crackers		
	\mathcal{Q}^{\prime}) Spreads		
	\mathcal{Q}^{0}	$\mathcal{Q}\mathcal{Q}\mathcal{Q}$	$\cup \cup \cup$) Snacks		
	Q^{\prime}		$\bigcirc \bigcirc \bigcirc$) Pastries		
	Q^{0}	$\bigcirc\bigcirc\bigcirc$	$\bigcirc\bigcirc\bigcirc$	Fruit Bars		
	$Q^{(i)}$		$\mathcal{O}(\mathcal{O})$	Granola Bars		
	\bigcirc	$\bigcirc\bigcirc\bigcirc$	$\bigcirc\bigcirc\bigcirc$	Desserts		
•	\bigcirc	$\bigcirc\bigcirc\bigcirc$		Fruits		
	\bigcirc	$\bigcirc\bigcirc\bigcirc$	$\bigcirc\bigcirc\bigcirc$	Cakes		
				Candy		
	\bigcirc	$\bigcirc\bigcirc\bigcirc\bigcirc$	$\supset \subset \subset$	Beverages		
			$\neg c c$	Overall MRE		

12. Were any of the food items damaged? YES IF YES, which items and where did you store that ration?

ONO

13. Of the 12 following		e in the MRE, he	ow many MRE m	enus would you l	ike each of the	0
No.)ne 1/4	1/2 3/4	Iced Coff Beve	erage Powder (Su erage Powder (Su le Cider	•	
Hot Sauce S		eteristics of the h	ot sauce containe	т.		
Very Poor 1	Moderately Poor 2	Slightly Poor 3	Neither Poor Nor Good 4	Slightly Good 5	Moderately Good 6	Very Good 7
Ease of open Ease of pour Durability o Taste of the	ning ring f package		· P	lease explain any rat for Good" (ratings o	ings below "Neither	
15. Rate the d	lurability of the	hot sauce conta	iner for field use. Moderately	Very	Extremely	
	Durable	Durable	Durable	Durable	Durable	
16. Rate the a Extremely Inappropriate	Moderately	-	e hot sauce contain either Inappropria Nor Appropriate	ate Somewhat		Extremely Appropriate
	re any problem lease explain.	s while opening	the hot sauce con	tainer? Y	ES O	
	hot sauce conta lease explain.	iner adequate for	r field use?	YES C	ONO	

19.	How did you open the using hands	hot sauce container? Choo	ose all the apply. using teeth	Other: _	
20.	Did the hot sauce spill,	splash from the container	while you were openi	◯ NO	1
21.	How often did the hot Once	sauce spill/splash while op 2-5 times	ening it? 6-9 times	IF NO, goto	Q23 crytime
22.	Was the spilling/splash	ing a problem?	YES NO	O	
23.	Would you liked a hot	sauce container that can b	e reclosed.	YES	ONO
24.	Do you have any further	er comments on the MRE	ration?		
25.	Do you have any furthe	er comments on the Heat &	z Serve ration ?		·
26.		r comments on the hot sau	ice container?		

APPENDIX C KCAL TABLES

		CONTROL GROUP				
	TOTAL		% KCALS			
	KCALS	В	L	D		
DAY 1	2637	34.3%	26.5%	39.2%		
DAY 2	2552	38.5%	29.1%	32.4%		
DAY 3	2961	47.5%	22.0%	30.5%		
DAY 4	2504	37.9%	21.5%	40.6%		
DAY 5	2306	38.3%	26.4%	35.3%		
DAY 6	3239	50.6%	21.4%	28.0%		
DAY 7	2366	29.2%	25.4%	45.4%		
DAY 8	2109	39.2%	22.4%	38.5%		
DAY 9	1541	50.4%	11.1%	38.5%		
AVE	2468	40.8%	23.3%	35.9%		

	TEST GROUP					
TOTAL		% KCALS				
KCALS	В	L	D			
2607	32.2%	32.9%	34.9%			
2593	37.5%	31.1%	31.5%			
2573	35.0%	33.7%	31.2%			
2983	33.5%	30.7%	35.9%			
2262	32.7%	33.8%	33.5%			
3136	46.7%	25.9%	27.4%			
2412	29.2%	34.1%	36.7%			
2996	35.0%	27.7%	37.4%			
2355	43.7%	29.1%	27.2%			
2658	36.4%	30.8%	32.9%			

		CONTROL GROUP				
	TOTAL	% FAT				
	% FAT	В	L	D		
DAY 1	33.0%	11.1%	10.4%	11.5%		
DAY 2	31.5%	12.1%	11.0%	8.4%		
DAY 3	35.4%	16.4%	8.7%	10.3%		
DAY 4	35.2%	17.3%	8.6%	9.2%		
DAY 5	33.7%	9.6%	10.6%	13.5%		
DAY 6	40.1%	21.2%	8.4%	10.4%		
DAY 7	33.9%	7.4%	10.3%	16.2%		
DAY 8	30.3%	12.0%	9.0%	9.4%		
DAY 9	33.0%	15.5%	4.3%	13.2%		
AVE	34.3%	13.9%	9.2%	11.2%		

TEST GROUP					
TOTAL		% FAT			
% FAT	В	L	D		
32.9%	9.2%	12.4%	11.3%		
32.2%	10.4%	11.5%	10.3%		
36.0%	12.4%	12.7%	10.9%		
35.1%	14.1%	11.6%	9.5%		
34.5%	8.9%	13.4%	12.2%		
43.7%	20.1%	10.5%	13.0%		
38.3%	9.7%	13.7%	14.9%		
35.0%	12.4%	11.3%	11.2%		
39.7%	16.7%	11.4%	11.6%		
36.5%	12.9%	12.0%	11.6%		

		CONTROL GROUP				
	TOTAL		% PRO			
	% PRO	В	L	D		
DAY 1	17.0%	5.7%	3.7%	7.6%		
DAY 2	14.6%	5.9%	4.0%	4.7%		
DAY 3	15.3%	5.5%	3.4%	6.3%		
DAY 4	16.3%	5.5%	3.2%	7.6%		
DAY 5	19.2%	8.0%	3.9%	7.3%		
DAY 6	11.7%	4.1%	3.2%	4.3%		
DAY 7	19.1%	6.3%	3.6%	9.2%		
DAY 8	16.2%	6.2%	3.5%	6.5%		
DAY 9	19.7%	10.7%	1.3%	7.7%		
AVE	16.2%	6.1%	3.4%	6.7%		

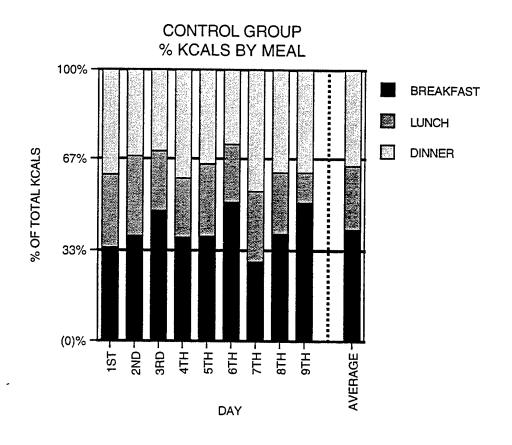
	TEST GROUP					
	TOTAL		% PRO			
	% PRO	В	L.	D		
	15.8%	5.3%	4.2%	6.3%		
	12.8%	4.6%	4.0%	4.3%		
	13.6%	3.5%	4.5%	5.6%		
ļ	14.4%	3.8%	3.8%	6.7%		
ı	15.2%	6.6%	4.5%	4.0%		
1	9.1%	3.7%	3.4%	2.0%		
	16.9%	5.8%	4.6%	6.4%		
1	12.5%	4.8%	3.9%	3.8%		
Ì	16.6%	8.0%	3.8%	4.8%		
	13 9%	5.0%	4 1%	4.8%		

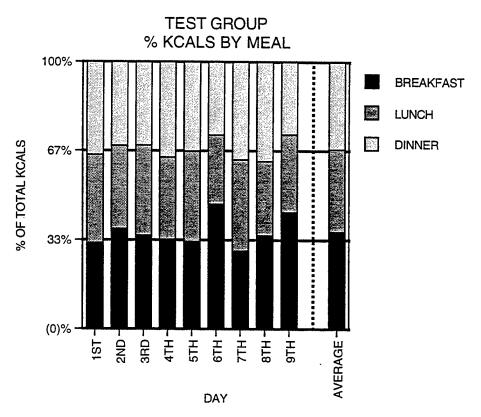
	CONTROL GROUP			
	TOTAL	% CARBO		
	% CARB	В	L	D
DAY 1	50.0%	17.4%	12.5%	20.0%
DAY 2	53.9%	20.6%	14.0%	19.2%
DAY 3	49.3%	25.9%	10.2%	13.2%
DAY 4	48.6%	14.9%	9.8%	23.8%
DAY 5	47.1%	20.7%	12.1%	14.4%
DAY 6	48.3%	24.9%	9.7%	13.6%
DAY 7	47.0%	15.4%	11.5%	20.0%
DAY 8	53.5%	21.1%	10.0%	22.4%
DAY 9	47.3%	24.1%	5.6%	17.6%
AVE	49 5%	20.7%	10.8%	18.0%

TEST GROUP			
TOTAL	% CARBO		
% CARB	В	L	D
51.3%	17.6%	16.0%	17.7%
55.0%	22.3%	15.4%	17.3%
50.4%	19.0%	16.2%	15.2%
50.5%	15.5%	15.4%	19.6%
50.3%	17.2%	15.7%	17.4%
47.2%	22.9%	12.0%	12.3%
44.9%	13.9%	15.9%	15.1%
52.5%	18.7%	13.1%	20.7%
43.7%	19.0%	13.5%	11.2%
49.6%	18.6%	14.7%	16.3%

		CONTROL GROUP		
	TOTAL	% NA		
	% NA	В	L	D
DAY 1	4613	47.9%	23.8%	28.3%
DAY 2	3737	41.6%	29.7%	28.7%
DAY 3	4339	37.9%	24.1%	38.0%
DAY 4	4461	32.8%	20.6%	46.5%
DAY 5	4263	44.3%	22.8%	32.9%
DAY 6	4689	32.8%	21.5%	45.7%
DAY 7	3942	39.0%	23.9%	37.2%
DAY 8	4111	36.5%	16.6%	47.0%
DAY 9	2867	55.3%	7.4%	37.3%
AVE	4113	40.3%	21.6%	38 1%

TEST GROUP			
TOTAL	% NA		
% NA	В	L	D
4750	43.6%	27.7%	28.7%
4329	35.4%	30.2%	34.5%
3164	29.8%	44.6%	25.6%
4680	27.9%	27.9%	44.3%
4054	38.9%	30.5%	30.6%
4396	30.1%	28.6%	41.3%
5087	28.8%	25.7%	45.5%
4481	33.2%	29.2%	37.6%
4577	49.9%	23.3%	26.8%
4391	35.4%	29.1%	35.5%





APPENDIX D PORTION SIZE RATINGS

MRE

	Food Item	Amount of food in Meal	Amount of food in Entree
Control Grp	Pork w/Rice	3.4	3.7
	Corned Beef Hash	3.7	4.0
	Chicken Stew	4.0	3.8
	Omelet w/Ham	3.4	3.9
	Spaghetti w/Meat Sauce	3.8	3.7
	Smoky Franks	3.3	3.6
	Beef Stew	3.7	3.6
	Ham Slices	3.7	3.5
	Pork Chow Mein	3.3	3.6
	Tuna w/Noodles	3.7	3.9
	Chicken w/Rice	3.7	3.6
	Esc Potatoes w/Ham	3.7	4.0
Test Grp	Teriyaki Beef	3.9	3.6
•	Meatloaf w/Gravy	3.7	3.7
	Beef Enchiladas	3.5	3.7
	Spicy Oriental Chicken	3.8	3.7
	Salsa Chicken	3.6	3.8
	Pasta Primavera Alfredo		3.7
	Sausage Patty	3.1	3.7

Heat &Serve

Breakfast	Food Item	Amount of food in Meal	Amount of food in Entree
Control Grp	Eggs	3.9	3.7
	Creamed Ground Beef	3.7	3.8
	Waffles	3.4	3.6
	Corned Beef Hash	3.9	4.0
	Creamed Ground Beef	3.6	3.8
Test Grp	Eggs	3.9	4.1
•	Creamed Ground Beef	3.7	3.8
	Blueberry Waffles	3.6	3.4
	Roast Beef Hash	3.6	4.2
Dinner			
Control Grp	Chicken Breast	3.6	3.6
r	Lasagna	3.6	3.7
	Meatballs w/Gavy	3.8	3.7
	Boneless BBQ Pork Ri		3.6
	Beef Patties	3.7	3.7
	Chicken Chow Mein	3.9	3.7
	Beef Patties	3.7	3.7
	Spaghetti w/Meatballs	3.9	3.9
	Turkey Slices	3.9	3.6
Test Grp	Chicken Breast	3.6	4.1
F	Boneless BBQ Pork Ri		3.8
	Chicken Teriyaki	3.8	3.9
	Beef Franks	3.6	3.7
	Turkey Slices w/Gravy	3.8	3.9